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# MONTANA BIOECONOMICS STUDY

## Results of the Elk Hunter Preference Study

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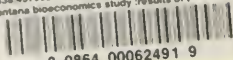
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MONTANA BIOECONOMICS STUDY

RESULTS OF THE ELK HUNTER PREFERENCE SURVEY

Prepared for

Montana Department of Fish, Wildlife and Parks

By

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## EXECUTIVE SUMMARY

The main goal of the Montana Bioeconomics Study was to estimate the economic value of elk hunting trips in Montana using travel cost and contingent valuation methods. This draft report summarized the results of the Hunter Preference Survey conducted during Fall 1986. It is a companion paper to the economic findings reported by John Loomis. The Hunter Preference Study had three objectives:

1. To clearly specify the products (elk hunting opportunities) for which economic values were estimated.
2. To learn more about elk hunters in Montana such as where they were from, why they were hunting, what type of experiences they had on their most recent trip, and how they viewed existing and potential hunting management actions.
3. To identify subgroups of elk hunters or hunter "types" who obtain similar benefits from elk hunting and should have similar perceptions of the trip's economic value.

### Sample Design

The Montana Department of Fish, Wildlife and Parks defined the study population as people who hunted elk in one of 18 Montana hunting areas during the 1986 general season (the areas were called Libby, Bob Marshall, Augusta, Fort Peck, Superior, Flint Creeks, Butte, Townsend, Little Belts, Pioneers, Tobacco Roots, Bridgers, Tendoy, Gravellys, Madisons, Gardiner, Absarokas, and Missouri Breaks).

The sampling frame was a list of 102,753 license holders (residents who purchased big game combination licenses or elk licenses and nonresidents who purchased one of the 17,000 nonresident big game combination licenses allotted in 1986).

The desired sample size was approximately 200 people for each of the 18 target hunting areas, the number needed to conduct the economic analysis. A stratified systematic random sample of 8,000 was drawn using the three license types as the strata. The data were analyzed and key findings reported separately for residents and nonresidents.

An adaptation of Dillman's (1978) Total Design Method was used to conduct the mail survey. A questionnaire booklet, cover letter, and a stamped, addressed return envelope were mailed to the sample in January 1987. A postcard reminder was sent one week later. On February 17, a followup letter and second copy of the booklet was sent to people who had not responded.

## Results

The target sample size was achieved or approached for 16 of the 18 areas (the two areas in eastern Montana were hunted by only .1 and .3 percent of the sample, so those results were not reported).

The overall response rate was 65 percent, somewhat lower than the response rate for the Angler Preference Survey (81 percent) but acceptable for mail questionnaires. Here are some characteristics of the 3,114 hunters who hunted in one of the study areas (these results differed by area as shown in the main report):

- \* 69 percent lived in Montana
- \* 95 percent were men, and their (median) age was 38 (nonresident hunters' average age was 43 compared to 37 years old for the residents)
- \* They had been hunting for ten years (median), residents an average of 15 years and nonresidents an average of 8 years
- \* They hunted a median of ten days per year, nearly all of which were in Montana
- \* 16 percent said elk hunting was their favorite outdoor recreation activity, 49 percent said it was one of their favorite, and 34 percent said it was one of many outdoor recreation activities in which they participated
- \* 30 percent of the residents were members of hunting, sport, or environmental organizations compared to 60 percent of the nonresidents
- \* 31 percent were making their first visit to the hunting area, but the median years hunting the target area was five
- \* Residents had been hunting the area an average of four years longer than had the nonresidents
- \* 13 percent hunted for one day or less on the most recent trip while 12 percent hunted for two days, nine percent for three, and 18 percent for four or five days; median trip length was five days (nonresidents' trips averaged two days longer than residents' trips)
- \* They hunted for eight hours a day (median)
- \* 32 percent of the nonresident hunters hired an outfitter or guide compared to just over one percent of the residents

- \* 99 percent hunted with a rifle
- \* 18 percent were successful in taking an elk (20 percent of the nonresidents and 17 percent of the residents)
- \* 81 percent of the elk taken by Montana residents were antlered compared to 87 percent of the elk taken by nonresidents
- \* Of the residents' antlered elk, 35 percent had one point on side 1 and 16 percent had six points on side 1
- \* Of the nonresidents' antlered elk, 28 percent had one point on side 1 and 22 percent had six points on side 1
- \* 40 percent of the nonresidents and 33 percent of the residents harvested other game on their most recent elk hunting trip
- \* 66 percent of the other animals taken were mule deer, 30 percent white-tailed deer, and two percent bear
- \* The average (median) number of miles walked was six
- \* 13 percent were alone in their vehicle, 41 percent were with one other hunter, 29 percent with two others, and 12 percent with three others
- \* 10 percent said they didn't see any other hunters; the median number of others seen was nine (mean number seen was 17)
- \* 49 percent said the number of other hunter seen was about as many as expected, 34 percent said it was more, and 17 percent said it was fewer than expected
- \* One third of the sample said that the other hunters affected their own enjoyment of the trip
- \* If hunters were affected by others, the most common reason was not enough space/too many people (which comprised 24 percent of the responses made), noise or visual intrusions (22 percent), less solitude (11 percent), competition for game (11 percent), and road hunting (9 percent)

Hunters were presented with a list of 16 possible reasons for hunting where they did and were asked to rate the importance of each. Of the five most important reasons people hunted where they did, only one was directly related to elk populations. Of the two items traditionally viewed as the main products of elk hunting opportunities, hunting for meat was rated as a more important reason than taking a trophy.



Several questions addressed hunting management issues. The first set of questions asked hunters about access road used for hunting:

- \* 68 percent said the number of roads open to vehicle use in the area was about right, 10 percent said there were too few, and 22 percent said there were too many roads for hunting purposes
- \* 33 percent said the number of open roads had not changed in the area in recent years, 24 percent said there were fewer open roads, 13 percent said there were more, and 28 percent were not sure
- \* 53 percent said hunters should be able to retrieve game with vehicles only on open roads, 31 percent said using closed roads should be allowed, and 22 percent said hunters should be allowed to use vehicles off roads to retrieve game

The other set of management questions presented hunters with six elk management scenarios and asked whether they would favor the policy, not favor it but accept it, would not accept it, or would need more information to make a decision. The following tables show how residents and nonresidents viewed the management options.

- A. No special permit to hunt bull elk would be needed. There would be considerable competition for bull elk but no restrictions other than having a license. You could hunt every year, but your odds of getting a bull would be less than 1 in 10.

---

	<u>Residents</u>	<u>Nonresidents</u>
Favor	39	20
Do not favor but would accept	24	24
Not Acceptable	17	29
Would need more information	21	26

---



- B. An unlimited number of bull elk permits would be available. You would be able to get a permit every year, but you would have to choose the one district where you would hunt and not be able to hunt in any other districts.

---

	<u>Residents</u>	<u>Nonresidents</u>
Favor	18	26
Do not favor but would accept	32	34
Not Acceptable	39	28
Would need more information	10	11

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- C. A limited number of bull elk permits would be available through a drawing in June. You would have to choose the one district where you would hunt and not be able to hunt in any other districts. You might get a permit only once every five years, but if you did obtain a permit you would have a much better chance (than one in ten) of getting a bull.

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	<u>Residents</u>	<u>Nonresidents</u>
Favor	10	18
Do not favor but would accept	18	24
No acceptable	63	45
Would need more information	8	12

---

- D. The taking of bull elk would be subject to point regulations. Hunters could shoot only bulls that had at least one antler with two or more points.

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	<u>Residents</u>	<u>Nonresidents</u>
Favor	41	53
Do not favor but would accept	32	28
Not acceptable	19	12
Would need more information	7	7

---

- E. The taking of bull elk would be subject to point regulations. Hunters could shoot only bulls that had at least one antler with five or more points.

---

	<u>Residents</u>	<u>Nonresidents</u>
Favor	10	16
Do not favor but would accept	22	29
Not acceptable	60	46
Would need more information	7	8

---

- F. To reduce pressure on bulls, antlerless elk permit holders would be allowed to hunt only antlerless elk and only in the hunting district where their permit was valid.

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	<u>Resident</u>	<u>Nonresidents</u>
Favor	57	57
Do not favor but would accept	22	22
Not acceptable	14	12
Would need more information	7	8

---

## Hunter Types

A cluster analysis was conducted on seven of the 16 reasons for choosing to hunt a given hunting area on their last trip. The seven items were selected because initial clustering runs and past research suggested that they would be the most efficient variables identifying distinct types of hunters, each of whom hunted for different reasons. Four distinct types of hunters were identified.

Nature hunters -- said they were hunting to be outdoors, for the solitude, to be close to home, and to get away from other hunters. Seventy-seven percent were Montana residents. Hunting for meat, enjoying the scenery, being in a natural area, and being with their family were all less important.

The four most important reasons for hunting where they did could apply to a wide variety of outdoor experiences in a natural environment, not just hunting. They were avid outdoors enthusiasts who likely participated in many recreational activities (only 13 percent said elk hunting was their favorite outdoor recreational activity).

Generalist hunters -- said their most important reason for hunting was being outdoors followed by hunting where game was abundant, for the solitude, for the meat, and because they'd had success hunting there before. Of the hunters in this cluster, 69 percent were Montana residents.

Their reasons for hunting were much more harvest related than those of Nature hunters suggesting that this group contained more serious hunters for whom hunting may not be as interchangeable with other activities. The highest percentage of the four clusters said that elk hunting was their favorite activity, and they saw and killed more elk than any other group.

Trophy hunters -- were the only group that rated getting a trophy as more important than getting meat. Avoiding other hunters was more important than it was for the other clusters, probably to decrease competition for elk.

Their most important reasons for hunting were to be where game was abundant, be with friends, get a trophy elk, to be outdoors, and to be with their families. Of the hunters in this cluster, 48 percent were Montana residents and 52% were nonresidents, the highest proportion among the four groups. Twenty-one percent of the trophy hunters said elk hunting was their favorite activity.

Meat hunters -- said that hunting for meat was their most important reason for hunting followed by being where game was abundant, hunting close to home, being outdoors, and because they had good success there before.

This group valued hunting for meat more than the generalist hunters did and placed far less value on trophies. They rated solitude, being outdoors, enjoying the scenery, being in a natural area, and being in rugged terrain as less important than any of the other types did. These were still rated as moderately important, however. Of the hunters in this group, 88 percent were Montana residents, the highest proportion of any type.

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## INTRODUCTION

The main goal of the Montana Bioeconomics Study was to estimate the economic value of elk hunting trips in Montana using travel cost and contingent valuation methods. This draft report summarizes the results of the Hunter Preference survey conducted during fall, 1986. It is a companion paper to the economic findings reported by Loomis (1987). The Hunter Preference Study had three objectives:

1. To clearly specify the products (elk hunting opportunities) for which economic values were estimated;
2. To learn more about elk hunters in Montana, such as where they were from, why they were hunting, what type of experiences they had on their most recent trip, and how they viewed existing and potential hunting management actions;
3. To identify subgroups of elk hunters, or hunter "types" who obtain similar benefits from elk hunting and should have similar perceptions of the trip's economic value.

This has been called the Hunter Preference Survey, but we really studied a full range of hunters' attitudes, beliefs, intentions, and behaviors. The next section reviews some of the applicable literature on hunting.

## BACKGROUND

When estimating the economic value of a nonmarket product such as an elk hunting opportunity, it's critical to define the product you're valuing (Driver, 1985). The elk are important, but so are other aspects of the places people go to hunt, such as the scenery, management regulations, and how many roads or other people are there. In other words, the product of managing big game hunting opportunities is not just the elk, but the whole hunting setting (defined by its physical, social, and managerial components) and the experiences people seek there.

Recreational activities such as hunting are done in so many different styles, in so many different hunting areas, and by so many different people, that there is no "average" hunter. Hunting, like other recreational activities, means different things to different people.

Hunting is subjectively perceived, but past research suggests several ways to develop a reasonable number of hunter "types," people who are seeking the same types of experiences through

hunting. It makes sense to attach dollar values not just to hunting, but to specific types of hunting trips taken in Montana. This is a compromise between lumping all hunters together (which assumes that all hunters seek the same experiences from hunting), and analyzing each hunters' responses individually.

Hobson Bryan's (1979) research on specialization paved the way for research attempting to identify managerially-relevant subgroups of recreationists. By observing and interviewing anglers on several trout streams in Montana and Idaho, Bryan developed a typology of anglers, from the occasional angler to whom fishing was a casual affair to the technique-setting specialists whose lives may revolve around fly-fishing. He (and subsequent researchers) extended the model to fit other activities, including hunting.

Bryan defined specialization as a developmental spectrum along which outdoor recreation participants may progress as they become more involved in a sport. The novice Montana anglers Bryan studied, for example, typically valued being outdoors and catching a fish -- any fish. As anglers learned more about fishing, they became more interested in catching lots of fish, and then, perhaps, with catching larger trout. As their techniques were refined, they became more specialized, seeking new types of experiences that depended more on specific characteristics of the resource, such as good trout habitat and regulations designed to conserve trout populations.

Not every hunter progresses orderly along this spectrum from Occasional to Generalist to Setting-Technique specialist. However, the typology is useful because it describes the types of experiences desired by hunters in each group -- what they value about hunting elk in Montana. The economic value should be higher for some types of experiences and lower for others.

Hunter subgroups also should differ on how they would prefer to see public lands managed, or the type of elk hunting regulations, because different experiences are supported (or prohibited) by different management programs. Occasional hunters may not care how the elk are managed -- as long as the hunters continue to have hunting area access.

The question then becomes how to define hunters' styles in useful ways. Past researchers have had success using cluster analysis to develop subgroups of hunters. Cluster analysis uses a set of variables, such as reasons for hunting or sources of hunting satisfaction, to group together hunters having similar patterns of responses across all the variables.

Hautaluoma and Brown (1978) used data collected in Washington state to identify ten hunter types, each having a different

pattern of satisfaction across five dimensions: nature; harvest; equipment; out-group contact; and skill. The resulting types differed on many other variables, such as commitment to the sport, the importance of harvest, and solitude. Brown, Hautaluoma and McPhail (1977) conducted a cluster analysis to identify eight hunter types of deer hunters in Colorado. Their clustering variables were four dimensions of satisfaction: easy hunt; harvest; out-group contact; and nature. Hautaluoma, Brown and Battle (1981) identified between five and seven hunter types of Colorado elk hunters (depending on license type, such as archery vs. rifle hunters).

One problem with these studies is that they all derived clusters (hunter types) statistically, instead of using an a priori framework or theory to guide cluster identification. One result of this was the typically large numbers of clusters that emerged (because they were statistically significant), which may be difficult to apply for management purposes. Instead, clusters were defined based on Bryan's framework and past research.

The next section reviews the questionnaire content in more detail after describing how the sample of hunters was chosen.

## SURVEY METHODS

### Sample Design

The Montana Department of Fish, Wildlife and Parks defined the study population as people who hunted elk in one of 18 Montana hunting areas during the 1986 general season (Figure 1). The sampling frame was a list of 102,753 license holders (residents who purchased big-game combination licenses or elk licenses, and nonresidents who purchased one of the 17,000 non-resident big game combination licenses allotted in 1986).

The desired sample size was approximately 200 people for each of the 18 target hunting areas, the number needed to conduct the economic analyses. A stratified systematic random sample of 8,000 was drawn using the three license types as the strata.

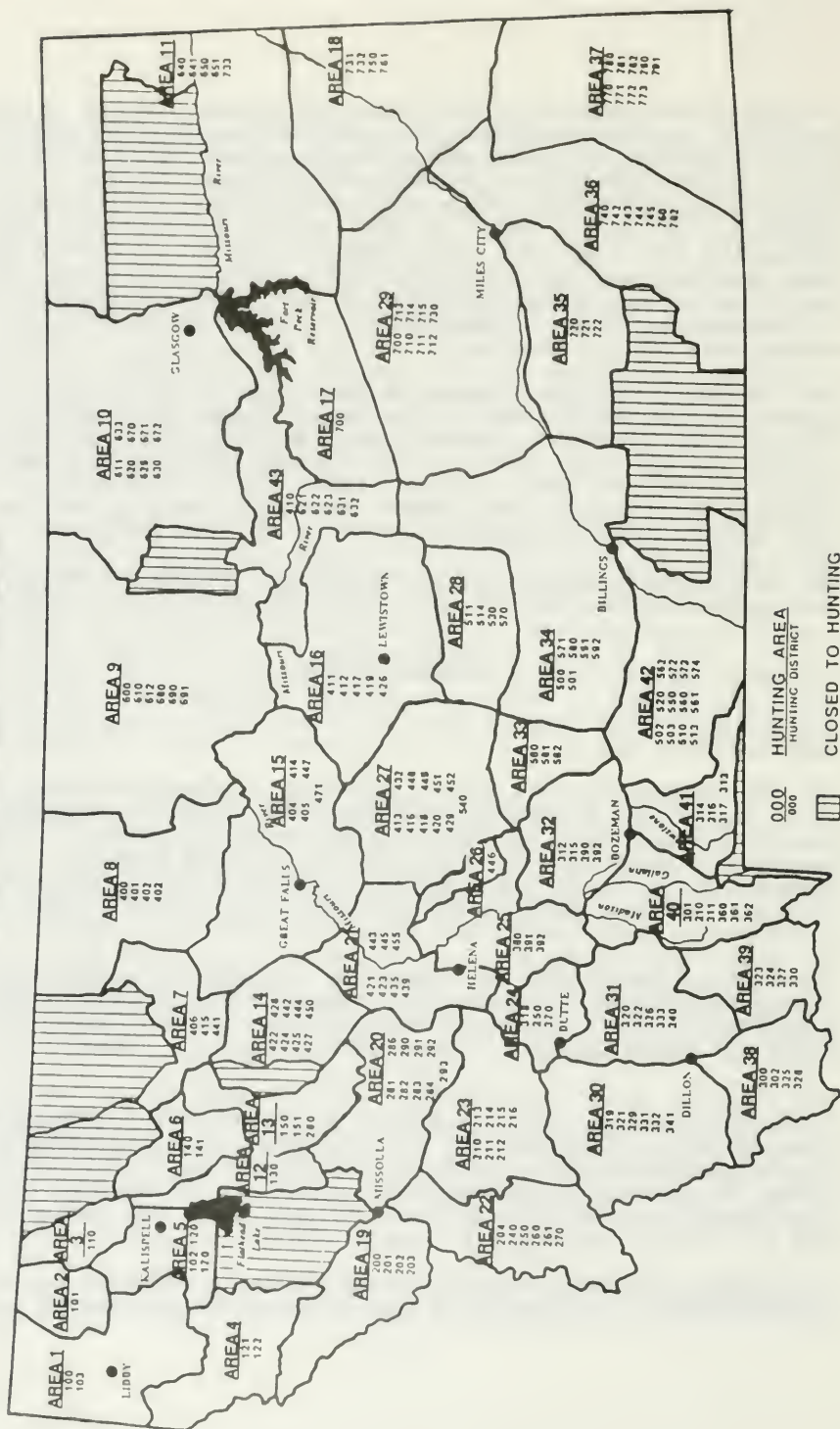
The sampling technique differed from that used in the Angler Preference Survey. We knew where the anglers had fished because they had been interviewed in the Department's annual telephone fishing pressure survey, allowing the sample to be stratified by river. No comparable information existed for the hunters so we didn't know in what specific area an individual had hunted during the 1986 season (or even if they'd hunted).

Originally, the Department planned to send 10,000 hunters questionnaires, 80 percent to residents and 20 percent to



Figure 1. Elk hunting areas, map.

# ELK HUNTING AREAS



\* Please put AREA #, not hunting District # on the survey form.



non-residents. When the sample size was cut to 8,000, only the number of resident hunters in the sample was reduced. Therefore, non-residents were oversampled; of the 8,000 hunters, 75 percent were residents and 25 percent non-residents. A more accurate estimate of 10-15 percent nonresident use is based on the Department's annual hunting pressure surveys. This means that the results were weighted by the views of non-residents.

Of course, residents and non-residents could have similar views on many aspects of hunting, in which case the results could be pooled safely. When the groups differ, however, the results do not accurately represent the views of the study population. There are several ways to deal with the overrepresentation. One possibility is to statistically weight the residents' data so their proportion in the sample would be the same as their proportion in the hunting population. This would correct the problem, but create some additional ones, such as in what units to report the results.

Instead, the data were analyzed and key findings reported separately for residents and non-residents. The results of the cluster analysis also helped to understand residence because it showed its effects combined with other study variables.

### Questionnaire Content

The questionnaire (Appendix A) first asked how long and how much the respondent had hunted and how hunting compared to their other recreation activities.

The next section asked about specific aspects of their most recent elk hunting trip in Montana, including to which hunting area(s) the trip was made, trip length, equipment used, elk seen and taken (if any), and whether a guide was employed.

The most recent trip was selected because the hunters would be likely to remember it well. However, the most recent trip might not represent peoples' trips over the season. For example, one would expect a high proportion of hunters who killed an elk during the season to have gotten it on their most recent elk hunting trip. The difference between early and later trips could be studied using the hunter baseline data, which contained information on all hunting trips taken during the season.

The next section asked hunters about the social setting on their last trip -- how many other hunters they saw, whether this was more or fewer than expected, and if other hunters affected their enjoyment. Hunters could have affected not only the elk population, but each other, competing for game or disrupting others' hunting. The social setting also could have had many positive effects; sharing the experience with friends or family is a central reason why people like to hunt.

Hunters were then asked to rate the importance of 16 reasons for choosing to hunt in that area. The cluster analysis used to define hunter types was conducted using a subset of these responses, grouping together hunters who responded similarly across the items. The resulting subgroups of hunters were compared on other variables such as type of equipment used and place of residence to define the similarities and differences among these hunter types.

Data needed for the economic analyses included distance traveled, time and money spent to reach the hunting area, and the maximum amount people said they'd be willing to pay for the trip beyond actual expenses. Two variations asked the maximum amount they'd pay to double the chance of taking a six-point or better bull elk or to see half as many hunters as they actually did.

Two questions were used to define the sample for the economic analyses. Respondents were asked if hunting was the main reason for making this trip away from home and if they were hunting primarily in one area.

Information on the perceived availability and use of substitute sites was collected for the travel cost estimates. The issue of resource substitutability has been a focus in the recreation literature for nearly two decades (Moss and Lamphear, 1970; Christensen and Yoesting, 1977; Baumgartner and Heberlein, 1981). In one of the better studies on substitutability, Shelby (undated) studied hunting on New Zealand fishing areas to see if they were true substitutes based only not on physical characteristics but in the beliefs, attitudes, and behaviors of the angler populations.

A full study of substitutability was not the goal of the Hunter Preference Study, but we asked hunters if they were hunting their favorite area, and whether they knew of any comparable elk hunting areas in Montana.

These questions viewed substitute settings in an unconstrained format; it was necessary to know what other hunting area(s) they might actually have visited, presumably constrained by the same factors as the trip they actually took. A series of questions asked where respondents might have hunted if they had to hunt elsewhere.

The questionnaire's next section measured the acceptability of six management actions designed to maintain a diversity of elk hunting opportunities in the state. Hunters indicated whether they favored the option, did not favor it but would accept it, would not accept it, or would need more information to respond.

The Department solicits public comment on regulation changes, but may hear primarily from the special interest groups and specialized hunters. Surveys of broader study populations such as this solicit comment from hunters whose views usually may not be heard, a good sounding board for potential management actions.

Demographic and other background information collected included age, gender, residence, employment status, education, income, and membership in hunting, sport, or environmental clubs or organizations. These variables have been useful in predicting hunter' desired experiences and management preferences.

The last page of the questionnaire was provided for hunters to write anything else about hunting that they wanted to tell managing agencies. Their responses, grouped into categories, are not only colorful but insightful, greatly increasing our understanding of Montana elk hunters.

### Questionnaire Administration

An adaptation of Dillman's (1978) Total Design Method was used to conduct the mail survey. An attractive questionnaire booklet, cover letter, and a stamped, addressed return envelope were mailed to the sample in January, 1987. A postcard reminder was sent one week later. On February 17, a followup letter and second copy of the booklet was sent to people who had not responded. This method typically yields response rates of at least 70 percent.

## RESULTS

### Response Rates

Table 1 shows the number of survey forms returned by hunters who hunted in each area. The target sample size was achieved or approached for 16 of the 18 areas (the two areas in eastern Montana were hunted by only .1 and .3 percent of the sample so those results will not be reported).

Of the 8,000 questionnaires mailed, 5,000 were completed and returned. Of the remaining, 121 people said they didn't hunt in 1986, 50 people returned the survey saying they were not going to participate, and 150 letters were undeliverable.

The overall response rate was 65 percent, somewhat lower than the overall response rate for the Angler Preference Survey (81 percent), but acceptable for mail questionnaires.

A non-response check was not conducted, but some of the hunters who did not complete the survey probably didn't hunt in 1986.

Table 1. Number of questionnaires returned by people whose most recent elk hunting trip took place in one of the 16 target areas.

---

<u>Hunting Area Number and Name</u>	<u>Completed Questionnaires</u>
1. Libby	267
13. Bob Marshall	109
14. Augusta	248
17. Fort Peck	9
19. Superior	240
20. Flint Creek	336
24. Butte	108
25. Townsend	200
26. Little Belts	69
30. Pioneers	284
31. Tobacco Roots	182
32. Bridgers	113
38. Tendoy's	79
39. Gravelly's	146
40. Madisons	271
41. Gardiner	293
42. Absarokas	112
43. Missouri Breaks	28
TOTAL:	3,114

---

Also, it was expected that hunters not as interested in management issues would be less likely to complete the questionnaire. The cover letter emphasized that the results would be used to improve hunting management.

One of the reasons for conducting the study was to learn more about the views and behaviors of people who may not testify at hearings, attend public meetings, or write to the Department about management concerns. In this context, the response rate of 65 percent was excellent. However, the 35 percent who didn't respond may differ from the respondents in other ways, too.

Another possibility is that hunters may have been less likely to return the questionnaire because they were just asked about their last hunting trip, while the anglers were asked about their most recent visit to a specific river. Surveys of specific populations may obtain higher response rates than surveys of broader, less well-defined populations.

### Description of the Hunters

This paper reports the results for the 3,114 hunters whose most recent trip was in one of the 16 hunting areas. It's first important to get a good idea of the hunters surveyed -- where they're from, their hunting history, and some basic demographic information.

- \* 69 percent lived in Montana (Table B-1 in Appendix B shows that the rate for individual hunting areas varied from 56 percent in the Libby area to 86 percent near Butte)
- \* 95 percent were men and their (median) age was 38 (non-resident hunters average age was 43, compared to 37 years old for the residents)
- \* 66 percent were employed full-time, 7 percent part-time, 9 percent retired, and 6 percent unemployed
- \* 33 percent finished high school, 28 percent attended college, 14 percent obtained a degree, 5 percent did some postgraduate work, and 8 percent had a postgraduate degree
- \* Their household income before taxes varied widely, with 4 percent under \$5,000 and 7 percent over \$75,000. The median income bracket was \$25,000 - \$30,000
- \* They had been hunting for 10 years (median), residents an average of 15 years and non-residents an average of 8 years
- \* They hunted a median of 10 days per year, nearly all of which were in Montana



- \* 16 percent said elk hunting was their favorite outdoor recreation activity, 49 percent said it was one of their favorite, and 34 percent said it was one of many outdoor recreation activities in which they participated (Table B-2 shows that these proportions varied from 7 percent of the Bridger area hunters to 23 percent of those who hunted in the Superior or Tendoy areas)
- \* 30 percent of the residents were members of hunting, sport, or environmental organizations, compared to 60 percent of the non-residents

### Most Recent Hunting Trip

Much of the questionnaire asked about respondents' most recent elk hunting trip. Because this was the "product" for which values were developed, this trip needed to be described in detail.

- \* 84 percent of the hunters had taken their most recent trip to the hunting area during the 1986 season, showing that the sampling method was successful in reaching current hunters
- \* 31 percent were making their first visit to the hunting area but the median years hunting the target area was 5 (Table B-3 shows the results by hunting area)
- \* Residents had been hunting the area an average of four years longer than had the non-residents
- \* 13 percent hunted for one day or less on the most recent trip, while 12 percent hunted for 2 days, 9 percent for three, and 18 percent for 4 or 5 days; median trip length was 5 days (non-residents' trips averaged two days longer than residents' trips)
- \* They hunted for 8 hours a day (median)
- \* 99 percent hunted with a rifle
- \* 32 percent of the non-resident hunters hired an outfitter or guide, compared to just over 1 percent of the residents (Table B-4 shows the percentages by hunting area)
- \* 18 percent were successful in taking an elk (20 percent of the non-residents and 17 percent of the residents); Table B-5 shows the percentages by hunting area)
- \* 31 percent of the hunters who hired an outfitter or guide harvested an elk, compared to 17 percent of the hunters who didn't hire a guide.



- \* 81 percent of the elk taken by Montana residents were antlered, compared to 78 percent of the elk taken by non-residents (Table B-6 shows the results by area)
- \* Of the residents' antlered elk, 35 percent had one point on side 1 and 16 percent had six points on side 1 (Table B-7 shows the results by area)
- \* Of the nonresidents' antlered elk, 28 percent had one point on side 1 and 22 percent had six points on side 1
- \* 40 percent of the non-residents and 33 percent of the residents harvested other game on their most recent elk hunting trip
- \* 66 percent of the other animals taken were mule deer, 30 percent white tailed deer, and 2 percent bear
- \* The average (median) number of miles walked was 6
- \* 13 percent were alone in their vehicle, 41 percent were with one other hunter, 29 percent with 2 others, and 12 percent with 3 others

- 
- \* Percent of residents and non-residents who said they used the following types of equipment on their most recent trip:
- 

	<u>Residents</u>	<u>Non-residents</u>
Dirt bike/ATV	4	4
Horse	22	37
Binoculars	80	86
Topographic maps	29	50
Backpacking tent	6	14
Wall tent	16	30
Snowmobile	2	1
Elk bugle	14	17
Camera	29	65
Spotting scope	22	31
Trailer	15	14
Motor home	3	5

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- \* 10 percent said they didn't see any other hunters; the median number of others seen was 9 (mean number seen was 17)

- \* 49 percent said the number of other hunters seen was about as many as expected, while 34 percent said it was more and 17 percent said it was fewer than expected
- \* One-third of the sample said that the other hunters affected their own enjoyment of the trip (Table B-8 shows these results by hunting area)
- \* If hunters were affected by others, the most common reason was not enough space/too many people (which comprised 24 percent of the responses made), noise or visual intrusions (22 percent), less solitude (11 percent), competition for game (11 percent), and road hunting (9 percent)

### Desired Experiences

Hunters' behaviors and management preferences should have been based in part on the type of experience they were seeking. The operational definition of this was hunters' reasons for choosing to hunt where they did on their most recent trip (Table 2).

Table 2 lists hunters' reasons for hunting, in order of importance (computed by adding together the percentage who said each reason was "very important" or "important"). Of the five most important reasons people hunted where they did, only one was directly related to elk populations. This demonstrates that the presence of elk, though obviously critical, was just part of the overall elk hunting experience. Hunters valued the opportunities to be outdoors, alone or with few others, in a natural setting with pleasant scenery. Social reasons for hunting, such as being with one's family or going hunting with friends, were far down the list, as were hunting close to home and good road access. Of the two items traditionally viewed as the main products of elk hunting opportunities, hunting for meat was rated as a more important reason than taking a trophy.

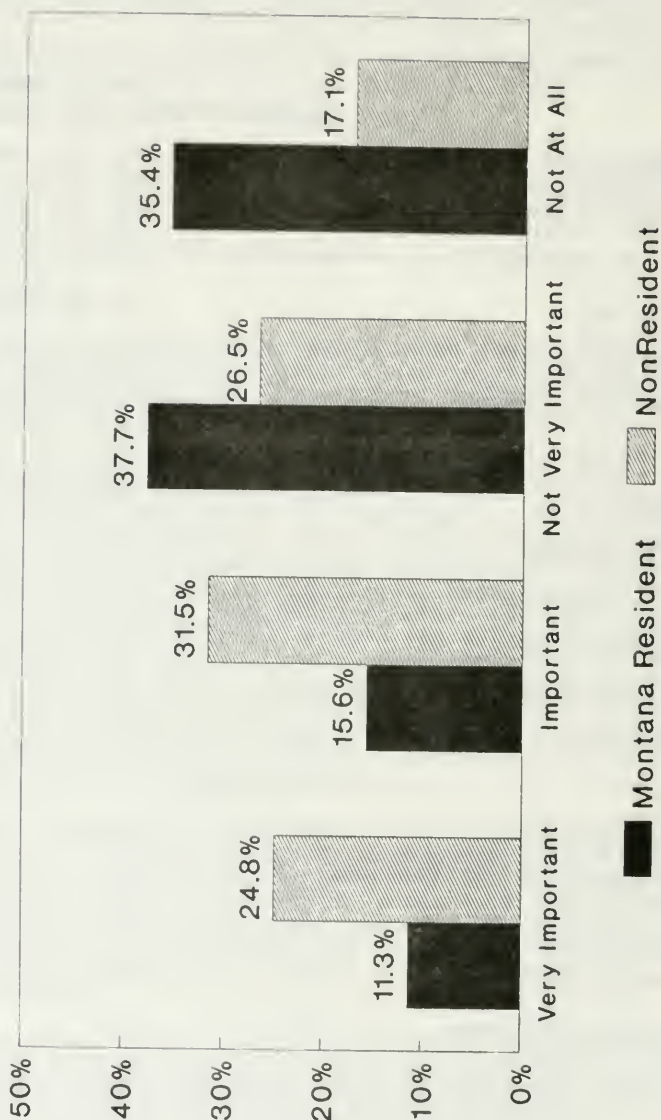
Residents and non-residents differed on many of their responses (Graphs 1-12). For example, Residents rated as more important good road access, hunting close to home, hunting for meat, and hunting with their family. Forty-three percent of the residents said hunting close to home was either not very or not at all important, showing that Montanans were willing to travel some distance for what they perceived to be a high quality elk hunting opportunity.

Non-residents rated as more important solitude, testing hunting skills, getting a trophy animal, viewing the scenery, being in a natural setting, getting away from other hunters, and being in rugged country. Montana's natural environment and its opportunities for solitude were one of the draws for out-of-state hunters who may live in places not having comparable hunting.

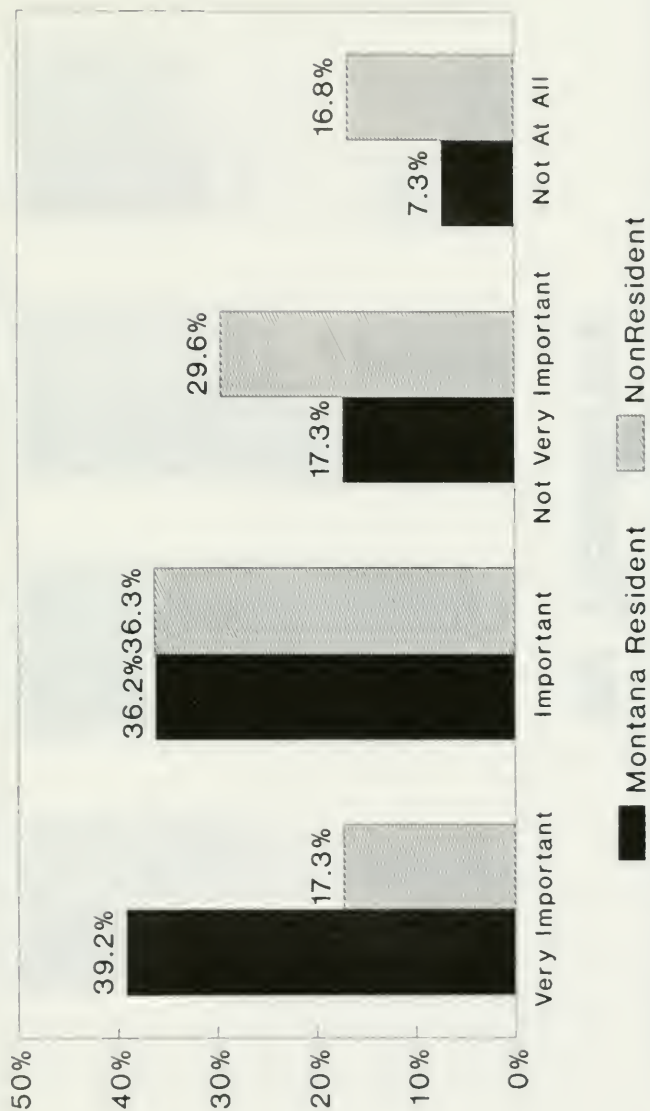
Table 2. Importance of 16 reasons for choosing hunting location (results in percent, listed in order of importance, with major break points indicated by dashed lines).

<u>Reason:</u>	<u>Very Important</u>	<u>Important</u>	<u>Not Very Important</u>	<u>Not At All Important</u>
To Be Outdoors	57	37	4	2
Many Elk in the Area	30	52	15	3
Be In Natural Setting	31	49	13	7
For the Solitude	36	43	16	5
View The Scenery	30	49	14	6
-----				
Past Hunting Good Here	23	50	17	10
For the Meat	32	36	21	10
Avoid Other Hunters	30	38	21	11
-----				
Test Hunting Skills	17	39	27	18
Be In Rugged Country	20	34	32	13
Hunt With Family	22	30	19	29
-----				
Hunt Close to Home	17	26	24	33
Good Road Access	11	31	34	23
Where Friends Were Going	14	27	23	36
Take a Trophy Elk	15	20	34	30
Special Permit for Area	9	12	18	61

# Importance of Taking a Trophy Elk by Residency

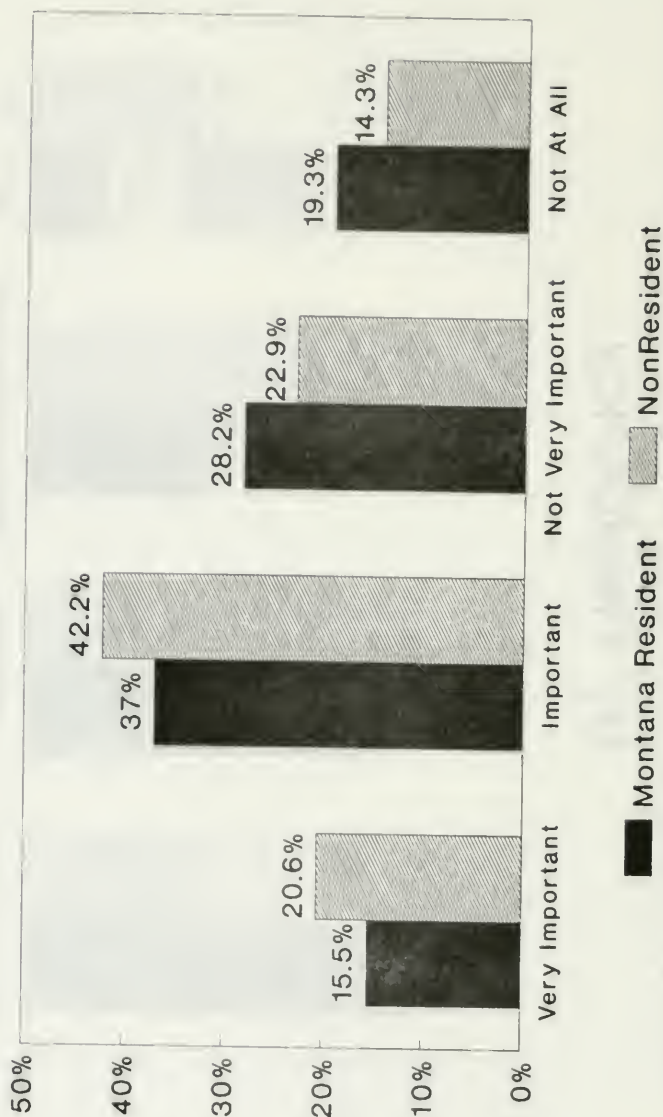


# Importance of Hunting for the Meat by Residency



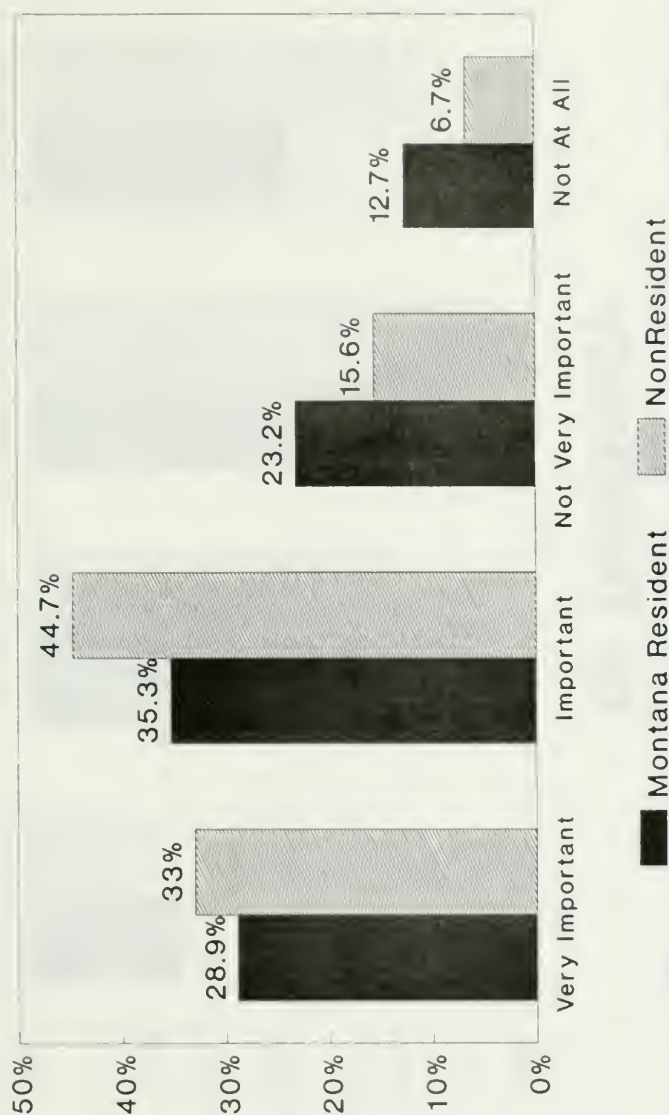


# Importance of Testing Hunting Skills by Residency

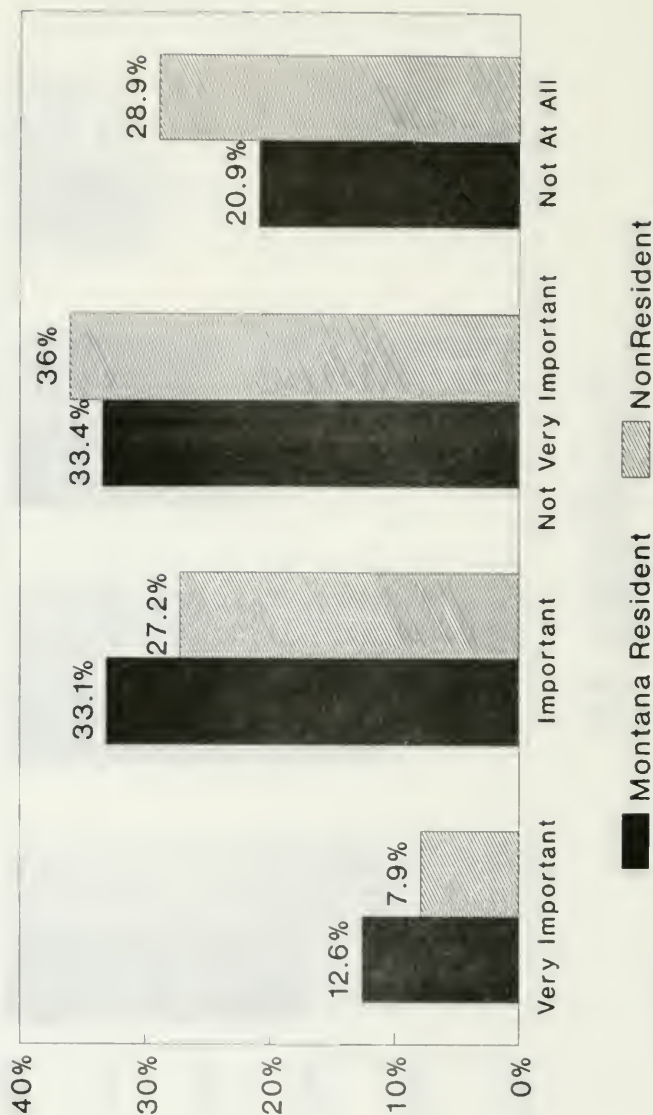




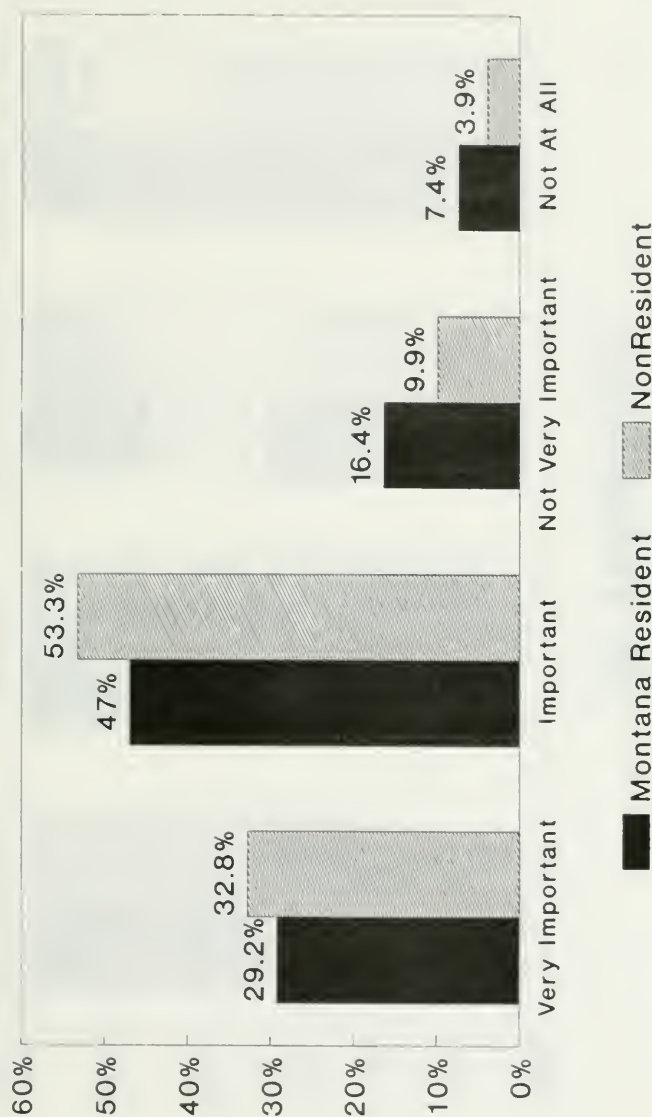
# Importance of Avoiding Other Hunters by Residency



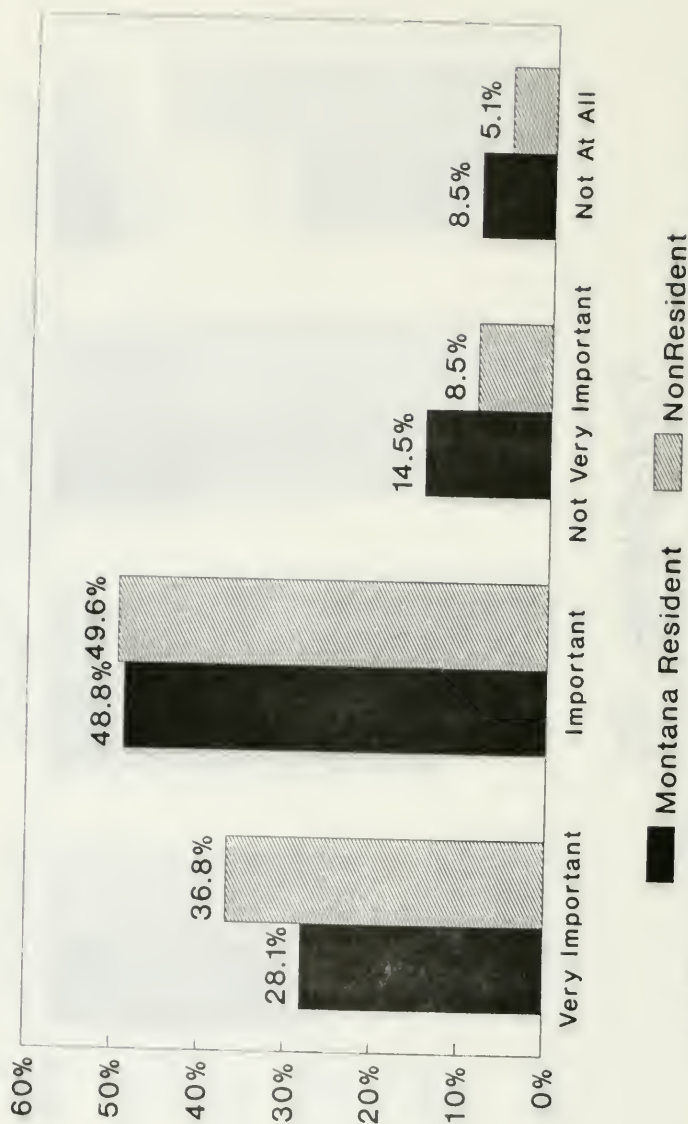
# Importance of Good Road Access by Residency



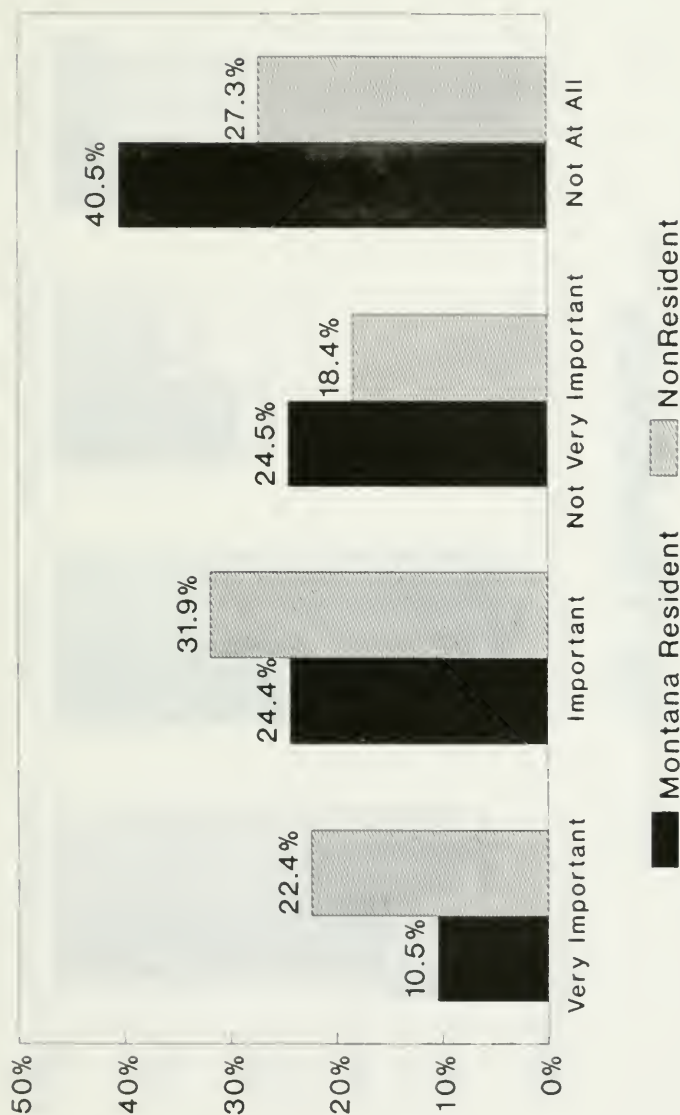
# Importance of Viewing Scenery by Residency



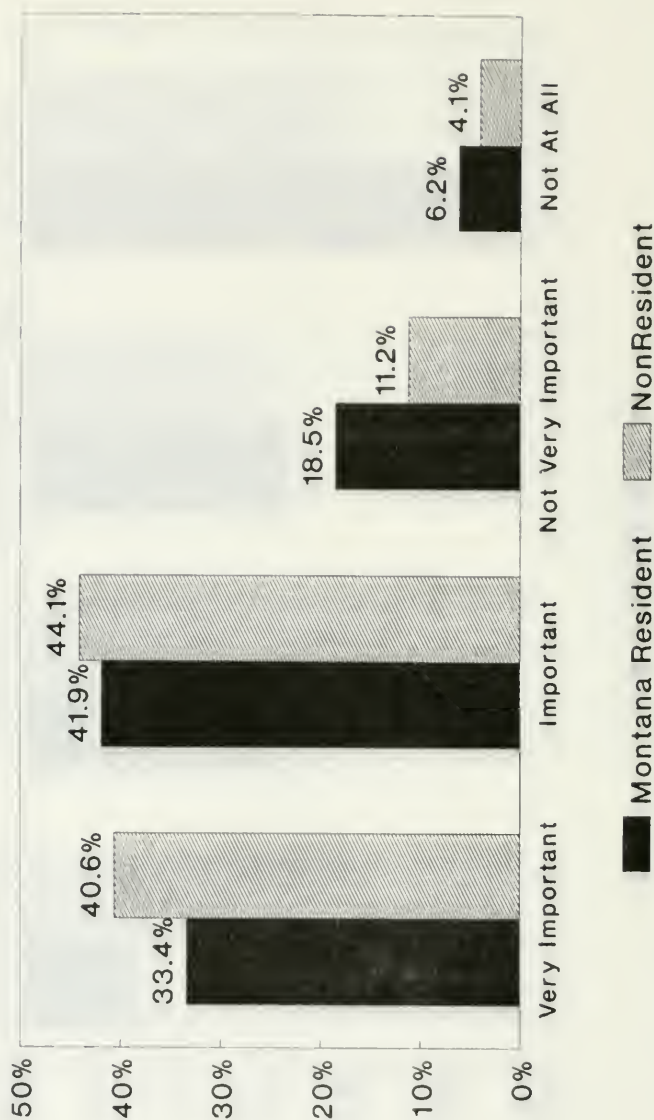
# Importance of Being in a Natural Setting by Residency



# Importance of Hunting Where Friends Are by Residency

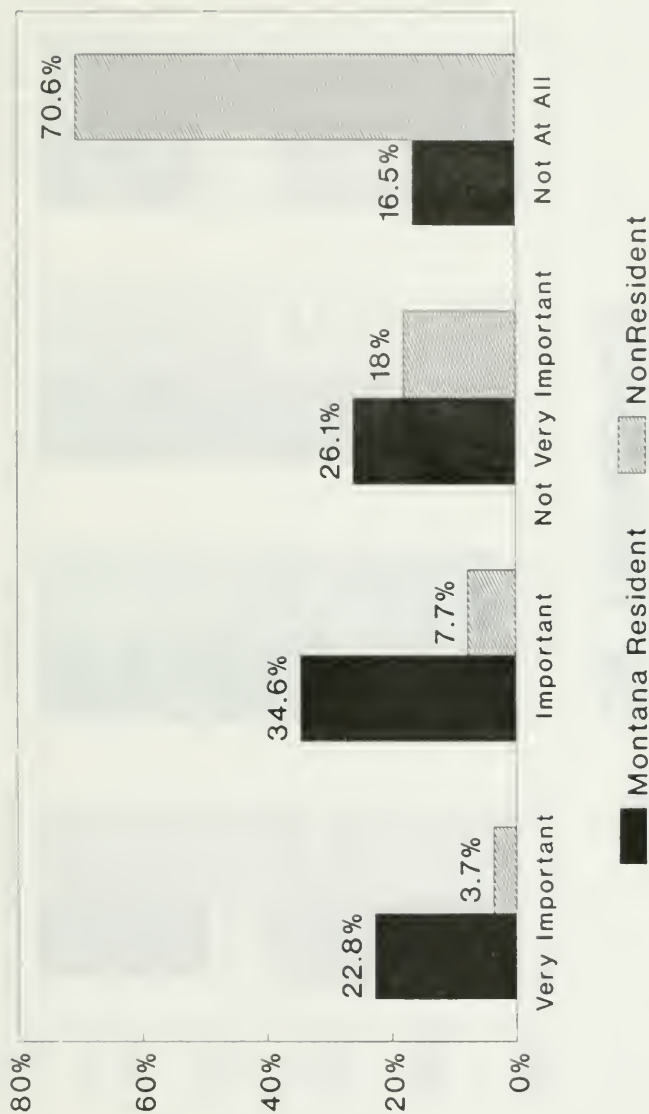


# Importance of Solitude by Residency

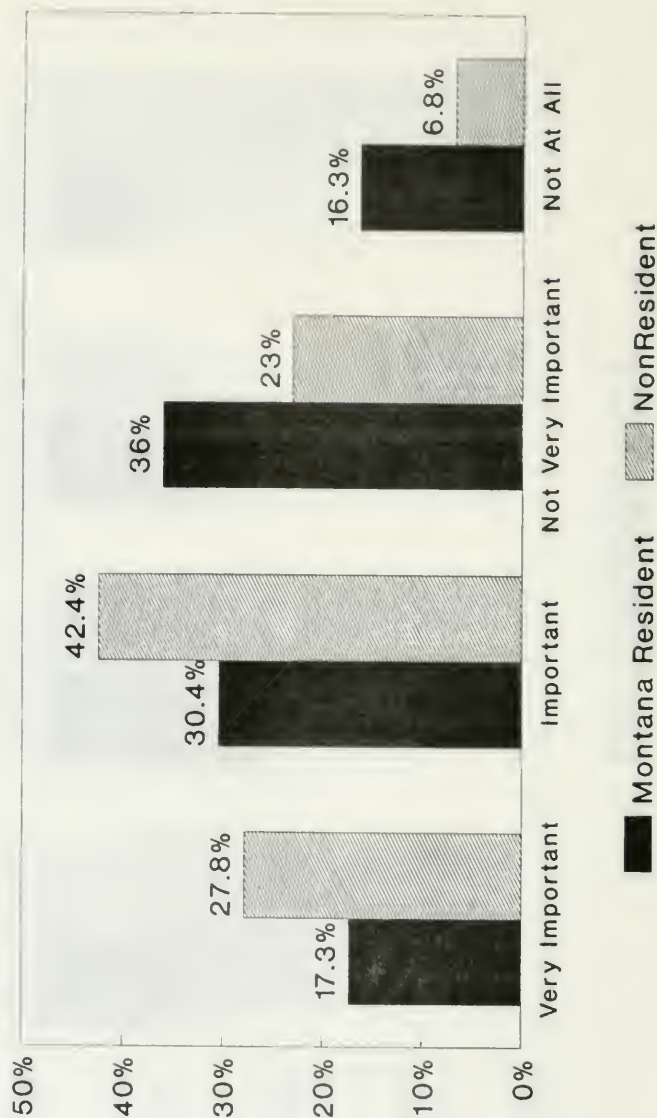




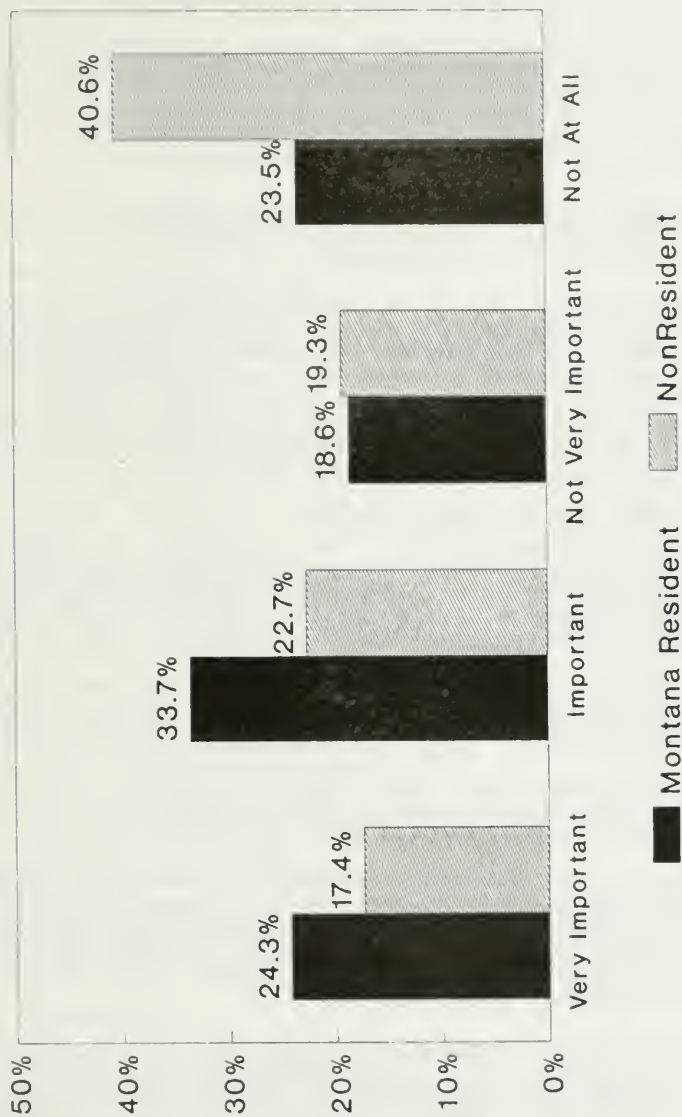
# Importance of Being Close To Home by Residency



# Importance of Rugged Country by Residency



# Importance of Hunting W/ Family Members by Residency



## Factor Analysis

A factor analysis was conducted to explore the underlying structure of the patterns of correlations among the 16 reasons for hunting. Factor analysis studies the intercorrelation matrix of the variables, searching for variables that are strongly intercorrelated with each other, but not with the rest of the variables. The resulting orthogonal (independent) factors are composed of variables that fit together; when one reason was rated as important, so were the others.

A principal components analysis with varimax rotation yielded four factors having eigenvalues greater than 1.0, and accounting for 52 percent of the variance.

The first factor was called Nature or Aesthetics because nearly all of its items related to valued characteristics of a natural environment. Accounting for 22 percent of the variance, this factor was composed of being in a natural setting (.80), the scenery (.78), being outdoors (.72), rugged country (.66), solitude (.61), avoid other hunters (.53), and weakly by test hunting skills (.39). (The numbers in parentheses are factor loadings, a kind of item-factor correlation coefficient).

The second factor, accounting for 12 percent of the variance, was called a Hunting Specialist factor because its variables all related directly to hunting, and specifically to obtaining a trophy. This factor was loaded by the presence of many elk (.71), getting a trophy (.66), good past hunting in the area (.57), and testing hunting skills (.45).

The third factor was called Generalist Local because it was loaded by only two items, hunting close to home (.72), and hunting for meat (.68), valued highly by many Montana hunters.

The fourth factor was called Social because it was loaded by hunting with friends (.62), good road access (.60), hunting with family (.51), and having a special permit (.47).

Factor analysis was useful because it grouped variables together based on their correlations, neatly summarizing complex interrelationships. But what we'd really like to do is group people (not variables) together based on what were the most and least important reasons why they hunted. That is the goal of the cluster analysis discussed later.

Here is a brief description of the questions pertaining to economic value. Loomis (1987) contains the full set of results and a discussion. The numbers in the two reports may not match perfectly because different truncating levels or sample delimiters could have been used.

- \* 93 percent said that hunting was the main reason for taking the trip away from home and 84 percent said they visited just one main hunting area on the trip
- \* The average distance to the hunting area from home was 121 miles for residents and 742 miles for non-residents
- \* The median amount personally spent on the trip by respondents was \$100.00 but the mean was \$481.00, with 15 percent spending \$1000.00 or more
- \* The total trip costs varied widely depending on where people lived; the average for residents was \$113.00, compared to \$1,287.00 for non-residents
- \* 71 percent of the resident hunters and 52 percent of the nonresident hunters said the trip was worth more than they had actually spent

A full discussion of resource substitutes is contained in John Loomis' report, but here is some basic information.

- \* 63 percent planned to continue hunting the area as frequently as they did, 15 percent more, and 19 percent less frequently
- \* 27 percent said they were hunting their favorite area in Montana, 39 percent said it was one of their favorites, 25 percent said it was one of many places they hunt, and 8 percent said they prefer to hunt elsewhere (Table B-9 shows these results by hunting area)
- \* 32 percent of the hunters who'd hunted in the area before said it was their favorite area, compared to just 14 percent of the first-time area visitors
- \* 63 percent said there were other Montana elk hunting areas that provided a comparable hunting experience (Table B-10 shows the results by area)
- \* 42 percent said that hunting in the alternate area was about the same as where they hunted, while 13 percent said the hunting was worse and 16 percent said it was better

### Management Preferences

Several questions addressed hunting management issues. The first set of questions asked hunters about access roads used for hunting; Tables B-11 to B-13 show the responses by residence.

- \* 68 percent said the number of roads open to vehicle use in the area was about right, 10 percent said there were too



few, and 22 percent said there were too many roads for hunting purposes

- \* 33 percent said the number of open roads had not changed in the area in recent years, 24 percent said they were fewer open roads, 13 percent said there were more, and 28 percent were not sure
- \* 53 percent said hunters should be able to retrieve game with vehicles only on open roads, 31 percent said using closed roads should be allowed, and 22 percent said hunters should be allowed to use vehicles off roads to retrieve game

The other set of management questions presented hunters with six hunting management scenarios and asked whether they would favor the policy, not favor it but accept it, would not accept it, or would need more information to make a decision. The specific management options included on the questionnaire were provided by the DFWP's Wildlife Division so the results should be useful immediately to wildlife and recreation managers. Here is the introduction to the question, the six scenarios, and the responses (reported separately for resident and non-resident hunters). Tables B-14 to B-19 show the results by area.

"Managing for a diversity of opportunities to hunt elk may require more hunting regulations. However, these regulations would restrict your hunting opportunities. We'd like to know your opinions on the following types of potential regulations to maintain a diversity of hunting opportunities in Montana."

- A. No special permit to hunt bull elk would be needed. There would be considerable competition for bull elk but no restrictions other than having a license. You could hunt every year but your odds of getting a bull would be less than 1 in 10.

---

	<u>Residents</u>	<u>Non-residents</u>
Favor	39	20
Do Not favor but Would Accept	24	24
Not Acceptable	17	29
Would need more information	21	26

---



- B. An unlimited number of bull elk permits would be available. You would be able to get a permit every year but you would have to choose the one district where you would hunt and not be able to hunt in any other districts.

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	<u>Residents</u>	<u>Non-residents</u>
Favor	18	26
Do Not favor but Would Accept	32	34
Not Acceptable	39	28
Would need more information	10	11

---

- C. A limited number of bull elk permits would be available through a drawing in June. You would have to choose the one district where you would hunt and not be able to hunt in any other districts. You might get a permit only once every 5 years, but if you did obtain a permit you would have a much better chance (than 1 in 10) of getting a bull.

---

	<u>Residents</u>	<u>Non-residents</u>
Favor	10	18
Do Not favor but Would Accept	18	24
Not Acceptable	63	45
Would need more information	8	12

---

- D. The taking of bull elk would be subject to point regulations. Hunters could shoot only bulls that had at least one antler with 2 or more points.

---

	<u>Residents</u>	<u>Non-residents</u>
Favor	41	53
Do Not favor but Would Accept	32	28
Not Acceptable	19	12
Would need more information	7	7

---

- E. The taking of bull elk would be subject to point regulations. Hunters could shoot only bulls that had at least one antler with 5 or more points.

---

	<u>Residents</u>	<u>Non-residents</u>
Favor	10	16
Do Not favor but Would Accept	22	29
Not Acceptable	60	46
Would need more information	7	8

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- F. To reduce pressure on bulls, antlerless elk permit holders would be allowed to hunt only antlerless elk and only in the hunting district where their permit was valid.

---

	<u>Residents</u>	<u>Non-residents</u>
Favor	57	57
Do Not favor but Would Accept	22	22
Not Acceptable	14	12
Would need more information	7	8

---

Two of the six options (D and F) were the most-favored among both residents and non-residents. Hunters generally did not appear to favor regulations that would restrict their ability to hunt what or where they wanted each season. Even the non-residents, who were generally more trophy oriented, did not favor taking only five-point or better bulls.

The resident hunters did not object to unlimited permits even if their chances of taking a bull were greatly reduced. This is consistent with other data showing that residents were more concerned with getting meat than getting a trophy.

The proportion of hunters who said they would need more information also was valuable, suggesting that expanded educational campaigns might not be effective for some of the management options.

#### Hunter Types: Results of the Cluster Analysis

The cluster analysis was conducted on seven of the 16 reasons for choosing to hunt a given hunting area on their last trip. The seven items were selected because initial clustering runs and past research (Allen, 1987) suggested that they would be the most efficient variables identifying distinct types of hunters--each of whom hunted for different reasons. For example, "To be outdoors," one of the 16 reasons for hunting, was rated as very important by just about everyone, so there was no variation in response.

The "not sure" responses were treated as missing values for the cluster procedure, resulting in a sample size of about 1500 for clustering. This trade-off was accepted because there was really

no basis for including "Not Sure" responses in the interval level scaling system needed for the cluster analysis.

The SPSSx Quick Cluster program was used because of the large number of cases analyzed. This method, designed for use on large data files, uses a nearest centroid sorting technique to assign cases to clusters based on Euclidean distance from the case to the cluster centers (Norusis, 1986). Cluster centers were not chosen a priori, but were selected from well-distanced cases

There were three main criteria for choosing the final number of clusters: the number of cases in each cluster had to be large enough (approximately 100) to permit economic analysis; the clusters had to make sense conceptually and define distinct hunter subgroups; and a parsimonious solution was preferred (the fewer clusters the better).

The Quick Cluster program did not select any specific number of clusters statistically, so the procedure was run for cluster sizes of 3, 4, 5, 6, and 7 to see which cluster size provided the best division of subgroups.

A final cluster size of four was chosen. This offered a better distinction among subgroups than fewer clusters, while more clusters did not add critical information. Analyzing four hunter types also corresponded well to Bryan's four levels of hunter specialization. The hunter types are specific to this set of variables; using a different set of questions to run the clustering procedure could have resulted in a different set of hunter types.

Figure 2 shows the scores of each hunter subgroup on each of the seven clustering variables. Both the absolute location of each cluster center on the scale (Very Important to Not At All Important) and the position of each subgroup relative to the other three groups are noteworthy. Here are descriptions of the four hunter types, including which three reasons for hunting they said were most important.

Nature Hunters -- Hunters in this group said they were hunting to be outdoors, for the solitude, to be close to home, and to get away from other hunters. Seventy-two percent were Montana residents (Table 3). Hunting for meat, enjoying the scenery, being in a natural area, and being with their family were all less important.

Their four most important reasons could apply to a wide variety of outdoor experiences in a natural environment -- not just hunting. They were avid outdoors enthusiasts who likely participated in many recreational activities (only 13 percent said elk hunting was their favorite outdoor recreation activity).

Figure 2.

# Importance of 7 Reasons for Hunting by Four Hunter Types

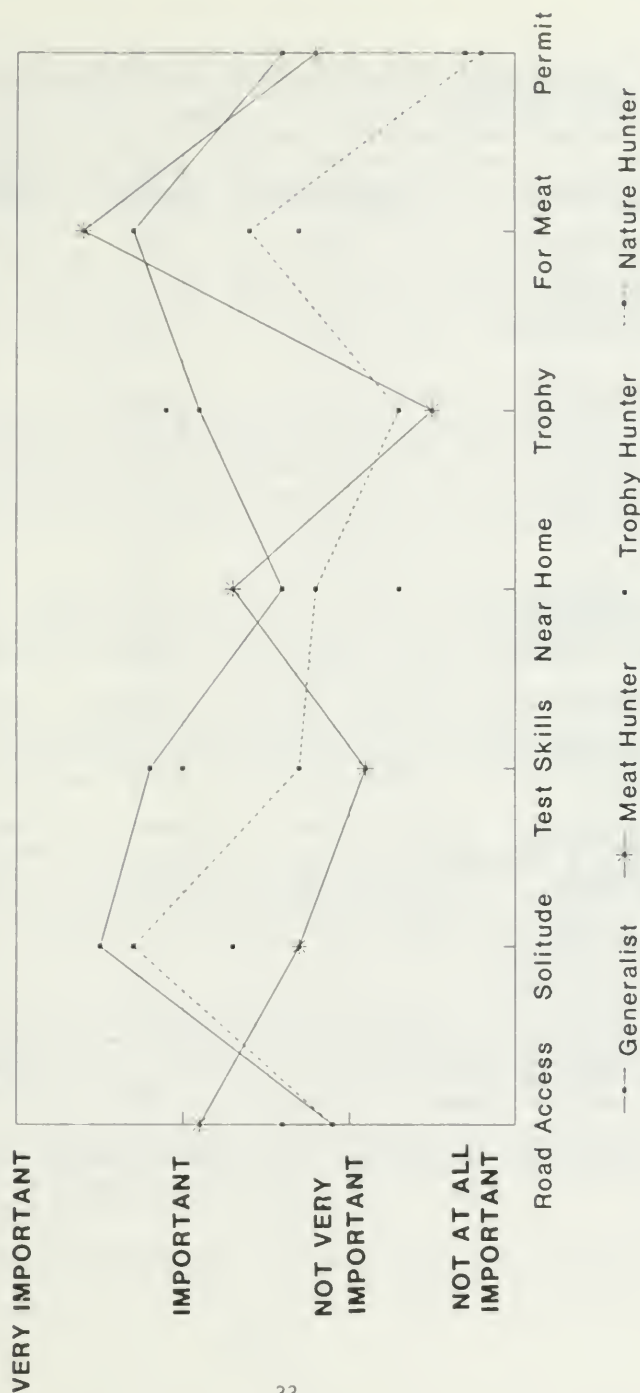


Table 3. Similarities and differences among the four hunter types (in percent).

<u>Characteristic</u>	<u>Generalists</u>	<u>Meat Hunters</u>	<u>Trophy Hunters</u>	<u>Nature Hunters</u>
Percent Residents	69	88	48	72
Percent Who Said Hunting Was Their Favorite Activity	22	12	21	13
Percent Who Hunt 1-5 Days Per Year	17	26	15	20
Percent Who Took an Elk	24	18	21	16
Percent Who Didn't See An Elk	17	26	19	24
Percent Who Said Trip Was Worth More than Actual Expenses	67	62	64	70
Percent Aged 11-20	12	14	9	7
Percent Who Used A Guide or Outfitter on the Trip	13	4	20	8
Percent Who Said Other Hunters Affected Their Enjoyment	40	29	32	32
Percent Who Said There Were Too Many Roads in the Area	27	16	18	24
Percent Who Said Hunters Should Use Vehicles Only on Open Roads to Retrieve Game	60	39	51	59



Their search for a quiet, natural area away from other hunters suggested that they hunt away from roads and wouldn't favor increased road access. Thirty-six percent of the hunters in this group said there were too many roads in the area they were hunting (Table 3), a much higher percentage than in the other clusters. Similarly, 59 percent said that hunters should be able to use vehicles to retrieve game only on open roads (Table 3).

Generalist Hunters -- Their most important reason for hunting was being outdoors, followed by hunting where game was abundant, for the solitude, for the meat, and because they'd had success hunting there before. Of the hunters in this cluster, 69 percent were Montana residents.

Their reasons for hunting were much more harvest-related than those of Cluster One, suggesting that this group contained more serious hunters for whom hunting may not be as interchangeable with other activities. The highest percentage of the four clusters said that elk hunting was their favorite activity (Table 3), and they saw and killed more elk than any other cluster.

Their views on roads were similar to those of the Nature hunters, but less strong; 27 percent said that their hunting area had too many roads, and 60 percent said that only open roads should be used by vehicles to retrieve game.

Trophy Hunters -- This was the only cluster that rated getting a trophy as more important than getting meat. Avoiding other hunters was more important than it was for the other clusters, probably to decrease competition for elk.

Their most important reasons for hunting where interviewed were to be where game was abundant, be with friends, get a trophy elk, to be outdoors, and to be with their families. Of the hunters in this cluster, 48 percent were Montana residents and 52 percent were nonresidents, the highest proportion among the four types. Twenty-one percent said elk hunting was their favorite activity.

These hunters had a more favorable attitude toward access roads; only 18 percent said there were too many where they hunted. Fifty-one percent felt only open roads should be used by vehicles to retrieve game.

Meat Hunters -- This group said that hunting for meat was their most important reason for hunting, followed by being where game was abundant, hunting close to home, being outdoors, and because they'd had good success there before.

This group valued hunting for meat more than did the generalist hunters, and placed far less value on trophies. They rated

solitude, being outdoors, enjoying the scenery, being in a natural area, and being in rugged terrain as less important than did any of the other types. These were still rated as moderately important, however. Of the hunters in this cluster, 88 percent were Montana residents, the highest proportion of any cluster.

Their views on roads were similar to those of Trophy hunters, but slightly more moderate; 16 percent said their hunting area contained too many roads, and 39 percent agreed that only open roads should be used by vehicles when retrieving game. The lowest percentage (12 percent) said elk hunting was their favorite outdoor recreation activity.

### Cluster Validation

It's desirable to assess how well-defined and separated the clusters are. One recommended way to explore and validate cluster analyses was to see if the resulting groups differ on external measures -- ones not used directly for the clustering procedure. (Aldenderfer and Blashfield 1984). Because the development of hunter types was based on a specific framework, we expected many of these additional characteristics to fit well with past descriptions, helping to define each cluster more precisely.

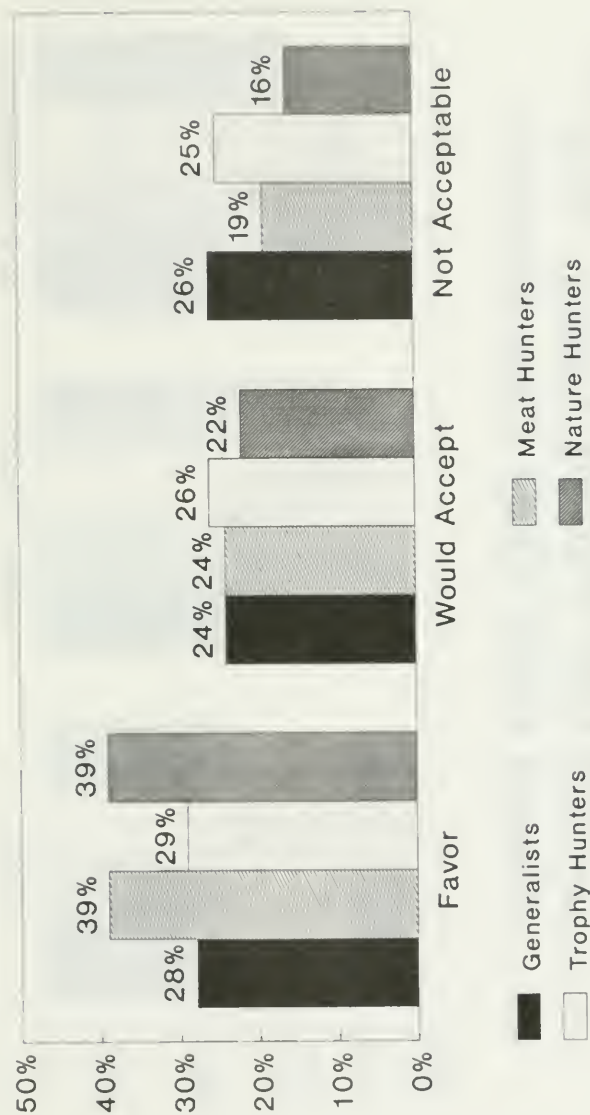
Table 3 shows some key similarities and differences among the four clusters. The four hunter types agreed on some management scenarios, but disagreed on others (Graphs 13-18).

The cluster analysis was valuable because it provided a fine-tuning of the economic estimates. The resulting hunter types should help us to better understand broad ranges of clientele and their management preferences.

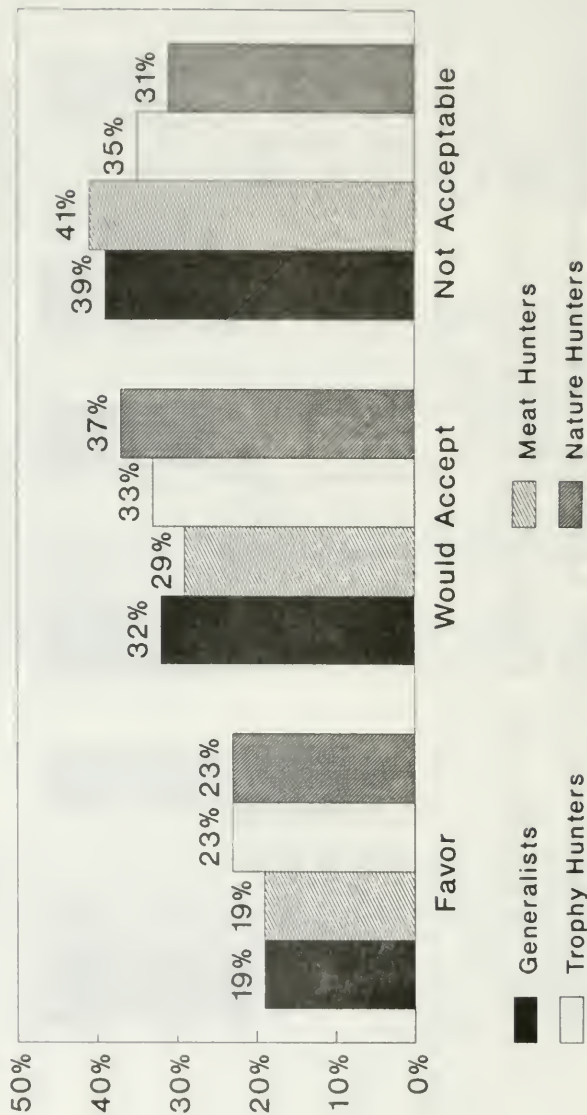
## CONCLUSIONS

The Hunter Preference Survey revealed much about the attitudes and behaviors of resident and non-resident hunters in Montana. The primary purpose was to define the elk hunting experiences for which economic values were being estimated, but the information gained should have many other management uses. This report summarized the principal findings; more in-depth analyses would further explore the relationships among variables studied to gain a better understanding of elk hunters in Montana.

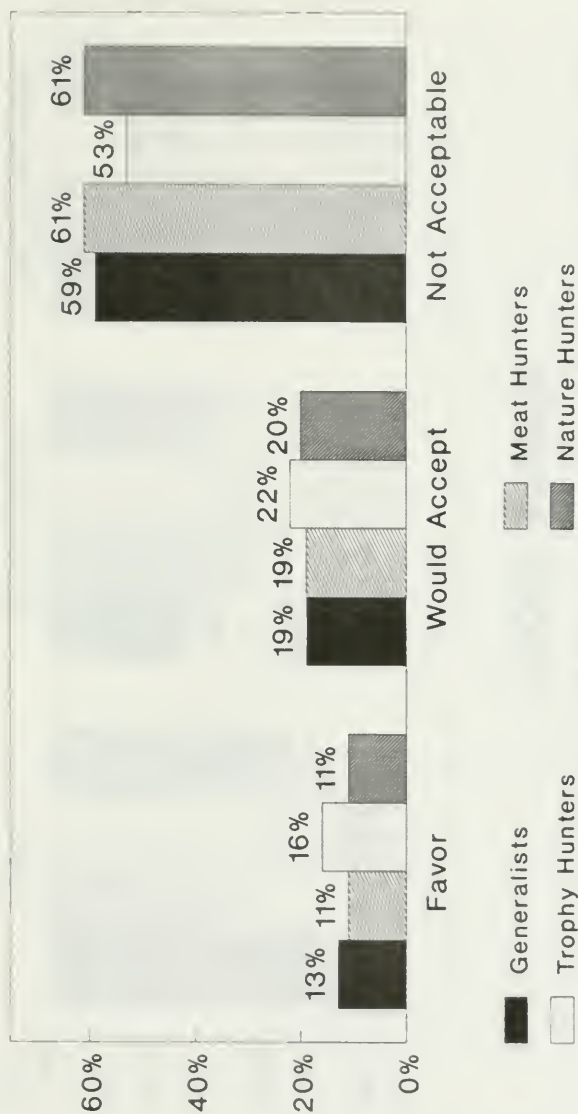
# No Special Permit to Hunt Bull Elk No Restrictions Other Than License Odds of Getting Bull <1 in 10



# Unlimited Bull Elk Permits Available Could Get Permit Every Year Could Hunt Only One District

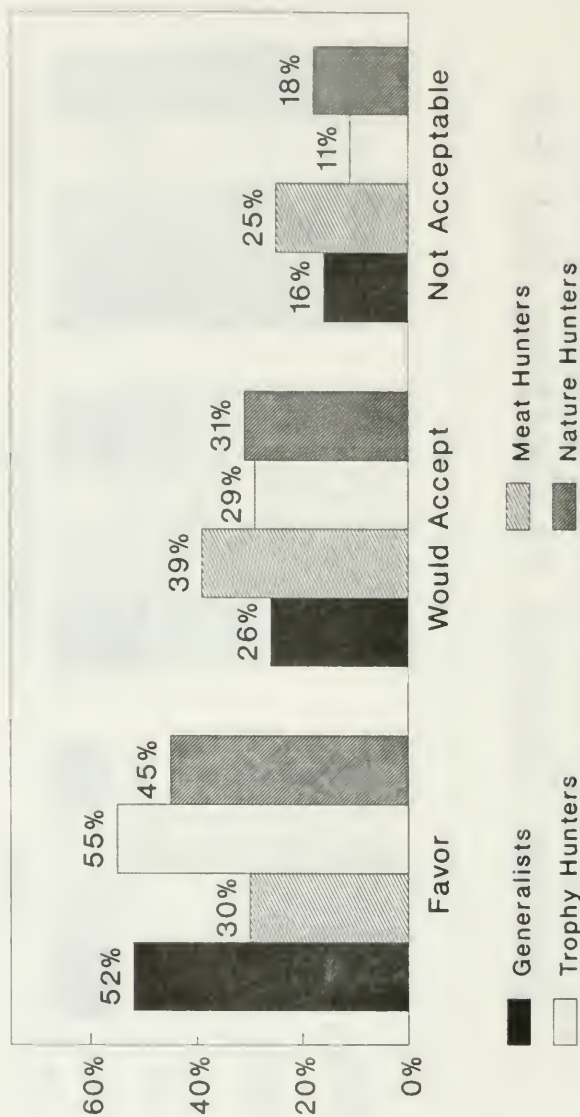


# Annual Drawing for Limited Bull Permits Could Hunt Only One District Better Chance of Getting Bull Elk



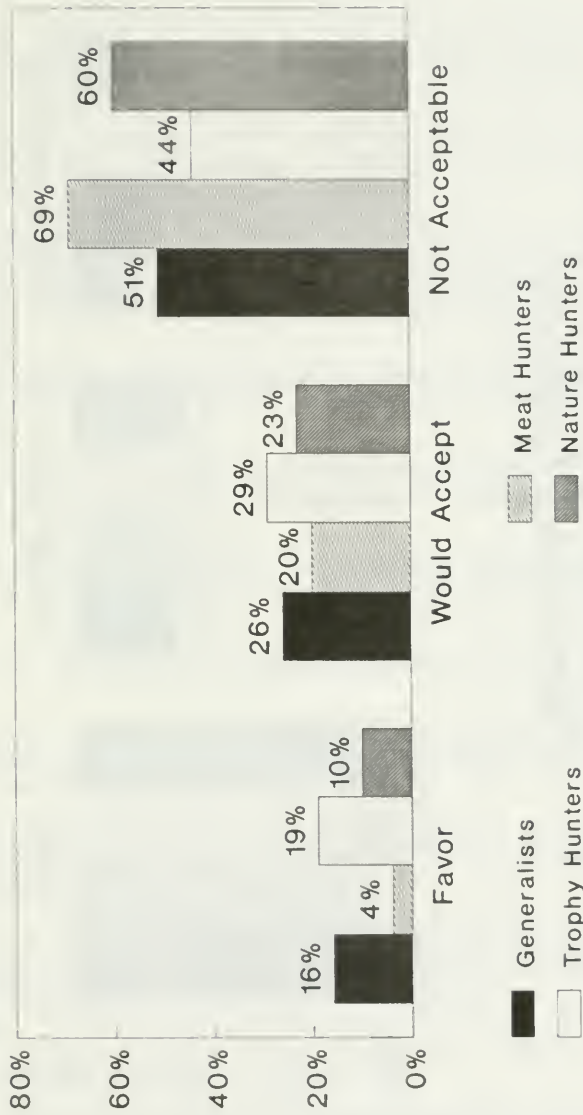


# Could Shoot Only Bulls That Had At Least One Antler With Two or More Points

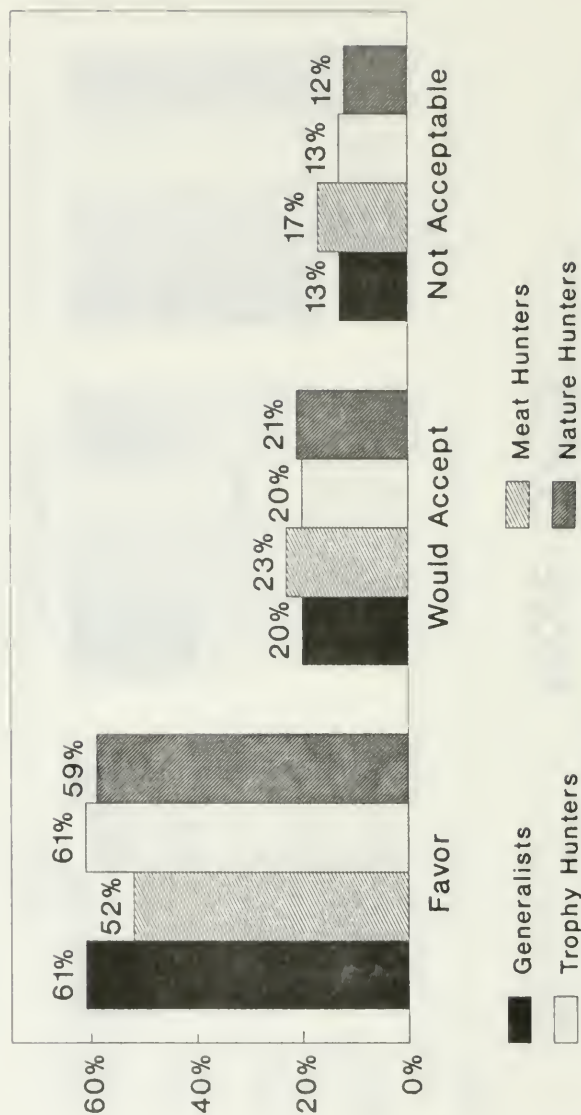




# Could Shoot Only Bulls That Had At Least One Antler With Five or More Points



# Antlerless Elk Permit Holders Could Hunt Only Antlerless Elk Only in Permitted District



## REFERENCES

- Allen, S. 1987. Phase II Report: The Impacts of the Garrison - Taft 500-kV Transmission Line on Elk Hunting Opportunities in Western Montana. Report prepared for the Montana Department of Natural Resources and Conservation, Helena.
- Baumgartner, R. and Heberlein, T.A. 1981. Process, Goal and Social Interaction Differences in Recreation: What Makes an Activity Substitutable? Leisure Sciences, 8(2), 112-122.
- Brown, P.J., Hautaluoma, J.E., and McPhail, S.M. 1977. Colorado Deer Hunting Experiences. In Transactions of the Forty-second North American Wildlife and Natural Resources Conference. Washington, D.C.: Wildlife Management Institute.
- Bryan, H. 1979. Conflict in the Great Outdoors. Sociological Studies No. 4, Bureau of Public Administration, University of Alabama.
- Christensen, J.E. and Yoesting, D.R. 1977. The Substitutability Concept: A Need for Further Development. Journal of Leisure Research, 9(3), 188-207.
- Driver, B.L. 1985. Specifying What Is Produced by Management of Wildlife by Public Agencies. Leisure Sciences, 7(1), 281-295.
- Dillman, D. 1979. The Total Design Method. New York: Wiley and Sons.
- Duffield, J. 1987. The Economic Value of Elk Hunting in Montana. Report prepared for Montana Department of Hunt, Wildlife and Parks, Helena.
- Hautaluoma, J.E., and Brown, P.J. 1978. Attributes of the Deer Hunting Experience: A Cluster-Analytic Study. Journal of Leisure Research, 10, 271-287.
- Hautaluoma, J.E., Brown, P.J., and Battle, N.L. 1981. Elk Hunter Consumer Satisfaction Patterns. In Forest and Hunting area Recreation: Research Update. St Paul, MN: University of Minnesota Agricultural Experiment Station.
- Hendee, J.C. A Multiple-Satisfaction Approach to Game Management. Wildlife Society Bulletin, 2, 104-113.
- Loomis, J. Elk Hunting Preference Economics Report (Draft 10/27/87). Report prepared for Montana Department of Fish, Wildlife and Parks, Helena.

- Moss, W.T. and Lamphear, S.C. 1970. Substitutability of Recreational Activities in Meeting Stated Needs and Drives of the Visitor. Environmental Education, 1(4), 129-131.
- Potter, D.R., Hendee, J.C., and Clark, R.N. 1973. Hunting Satisfaction: Game, Guns, or Nature? In Transactions of the Forty-second North American Wildlife and Natural Resources Conference. Washington, D.C.: Wildlife Management Institute.
- Shelby, B. undated. Resource and Activity Substitutes for Recreational Salmon Hunting in New Zealand. Paper presented to annual meeting of the Western Association of Recreation Professionals at Sleeping Child Hot Springs, Montana, 198-.
- Stankey, G.H., Lucas, R.C., and Ream, R.R. Relationships Between Hunting Success and Satisfaction. In Transactions of the Forty-second North American Wildlife and Natural Resources Conference. Washington, D.C.: Wildlife Management Inst.

APPENDIX A

QUESTIONNAIRE AND CODING MANUAL



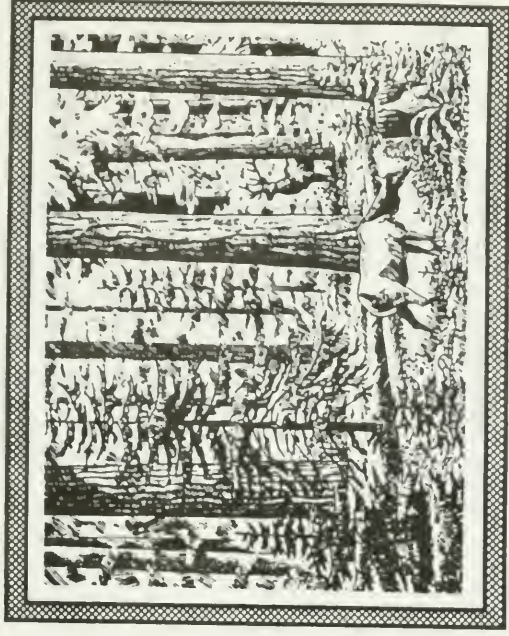


Thank you for your help. Is there anything else you'd like to tell us about hunting in this area? We would appreciate any comments.

# MONTANA

## ELK HUNTING SURVEY

1986



*Montana Department of  
Fish, Wildlife & Parks*

Thanks again. If you would like to receive a copy of the survey results, please write "Results requested" and your address on the back of the return envelope (not on this questionnaire).

1. FIRST, WE HAVE SOME GENERAL QUESTIONS ABOUT YOUR HUNTING.

- How many years have you been hunting elk? \_\_\_\_\_ Year
- About how many days per year do you hunt elk? \_\_\_\_\_ Days
- How many of these days are spent in Montana? \_\_\_\_\_ Days
- How would you rate elk hunting compared to your other outdoor recreation activities? (please check one)
  - It's my favorite outdoor recreation activity \_\_\_\_\_
  - It's one of my favorite outdoor recreation activities \_\_\_\_\_
  - It's just one of several outdoor recreation activities that I do \_\_\_\_\_
  - I prefer other outdoor recreation activities \_\_\_\_\_

11. THE NEXT QUESTIONS ASK ABOUT YOUR MOST RECENT ELK HUNTING TRIP IN MONTANA DURING THE GENERAL SEASON.

- Approximate dates(s) of this last trip: \_\_\_\_\_  
(A trip could be anything from an hour to several or more days)
- Use the map provided to show what HUNTING AREA you visited on this trip. (If you hunted in more than one area, write the number of the ONE area where you spent the most time)

Number of hunting area (from map on back of the cover letter): \_\_\_\_\_

IN ALL OF THE FOLLOWING QUESTIONS, "THIS AREA" MEANS THE AREA WHOSE NUMBER YOU JUST LISTED.

- On this trip, how many days did you hunt in this area?  
\_\_\_\_\_ Days
- About how many hours per day did you hunt? \_\_\_\_\_ Hours

5. About how many elk did you see while hunting in this area?

\_\_\_\_\_ Elk seen in this area

6. Did you kill an elk in this area? \_\_\_\_\_ Yes \_\_\_\_\_ No

7. If yes, what kind did you get?

\_\_\_\_\_ Antlered \_\_\_\_\_ Antlerless

If your elk was antlered, how many points did it have on each side?

Points on side 1: \_\_\_\_\_ Points on side 2: \_\_\_\_\_

7a. District number where elk was killed (from map): \_\_\_\_\_

8. Did you get any other big game in this hunting area?

\_\_\_\_\_ Yes \_\_\_\_\_ No

9. If yes, what species did you shoot?

\_\_\_\_\_ Mule deer \_\_\_\_\_ Bear  
\_\_\_\_\_ White-tailed deer \_\_\_\_\_ Other: \_\_\_\_\_

10. Was this area the only place you hunted on this trip, or did you hunt in other areas listed on the map? (Please check one)

\_\_\_\_\_ This area was the main or only one I hunted on this trip away from home

\_\_\_\_\_ This area was one of several areas I hunted in on this trip

11. If you did hunt in other areas on this trip, please list the area numbers from the map: \_\_\_\_\_

12. What type of equipment did you use in this area? (please check all that apply)

\_\_\_\_\_ Muzzle loader \_\_\_\_\_ Rifle \_\_\_\_\_ Bow and arrow

13. Did you hire a hunting guide or outfitter in this area?

\_\_\_ Yes \_\_\_ No

14. Was hunting the main purpose of your trip away from home when you hunted in this area or did you make the trip for other reasons such as business or a family vacation? (please check one)

\_\_\_ Hunting was the main purpose of this trip

\_\_\_ Hunting was one of several reasons for making the trip

15. Which of the following items did you use while hunting in this area? (please check all items you used)

\_\_\_ Dirt bike or ATV \_\_\_ Wall tent

\_\_\_ Horse \_\_\_ Snowmobile

\_\_\_ Binoculars \_\_\_ Elk bugle

\_\_\_ Topographic map \_\_\_ Camera

\_\_\_ Backpacking tent \_\_\_ Spotting scope

\_\_\_ Teatler \_\_\_ Motor home

16. About how far did you walk while you were hunting in this area? (please use an average if you hunted more than a day)

\_\_\_ miles

17. About how many other hunters (not in your party) did you see while you were hunting this area on this trip?

\_\_\_ Other hunters

18. Was this number of hunters: (please check one)

\_\_\_ More than I expected to see

\_\_\_ About as many as I expected to see

\_\_\_ Fewer than I expected to see

\_\_\_ I didn't have any expectations

19. Did the other hunters present affect your enjoyment of the hunting in this area?

\_\_\_ Yes \_\_\_ No

20. If yes, please explain how:

21. Was this the first time you hunted in this particular area?

\_\_\_ Yes \_\_\_ No, I've hunted here before

22. If No, how many years have you been hunting in this area?

\_\_\_ Years

23. How does this area rate compared to other areas in Montana? (please check one)

\_\_\_ It's my favorite place to hunt

\_\_\_ It's one of my favorite places to hunt

\_\_\_ It's one of many places where I hunt

\_\_\_ I prefer to hunt other places

24. For hunting purposes, do you feel the number of roads to vehicle use in this area is: (please check one)

\_\_\_ Too few

\_\_\_ About right

\_\_\_ Too many

25. In the last few years, has the number of open roads in this area increased, decreased, or stayed the same? (check one)

\_\_\_ Number of open roads in this area has increased

\_\_\_ Number of open roads in this area has decreased

\_\_\_ Number of open roads in this area is the same

\_\_\_ I'm not sure

26. For game retrieval purposes, how do you feel the existing roads in this area should be managed? (Please check one)

- Hunters should be allowed to use only open roads to retrieve game with a vehicle
- Hunters should be allowed to use closed roads to retrieve game with a vehicle
- Hunters should be allowed to use vehicles off roads to retrieve game

27. How many separate trips did you make from your home to this hunting area this season?

— Separate trips from home this year

28. About how frequently do you plan to hunt in this area in the future? (Please check one)

- As frequently as I do now
- More frequently than I do now
- Less frequently than I do now

29. Are there any other hunting areas in Montana that you feel provide a hunting experience comparable to the this particular area?

— Yes — No

30. If yes, please list the numbers of any other comparable hunting areas from the map:

31. Suppose you were told you could not hunt elk in this area on this trip. What other area might you have hunted instead?

Please specify area number from map: \_\_\_\_\_

32. About how far is it from your home to this alternative hunting location?

— Miles

33. How does it compare to hunting where you did?

16. People hunt for many reasons. We'd like to know some of the reasons you hunted this area on this trip. To help us understand different types of hunters and their preferences,

following is a list of possible reasons for hunting. Please check the box that says whether that reason was very important, important, not important, or not at all important a reason you hunted in this particular area on this trip.

	Very Important	Important	Not very Important	Not at all Important	Sure
1. Good road access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. For the solitude	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Because there are lots of elk there	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. To test my hunting skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. It's close to home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. To get a trophy elk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. To be outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I've had good hunting here	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. For the meat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. To view the scenery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Because I had a special permit for the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. To be in a natural setting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. To hunt with family members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. It's where my friends were going	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. To get away from other hunters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. To be in rugged country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Could you please look back over this list and circle the numbers of the three most important reasons you hunted in this area on this trip?

111. THE NEXT FEW QUESTIONS WILL HELP US TO UNDERSTAND THE VALUE YOU PLACE ON HUNTING IN THIS AREA.

WE REALIZE YOU AREN'T USED TO CONSIDERING HUNTING THIS WAY. BUT PLEASE THINK ABOUT IT AND GIVE US YOUR BEST ESTIMATE!

1. About how far is it from your home to where you hunted in this area on this trip?

\_\_\_\_\_ Miles (one-way)

2. How long did it take to travel from your home to this area?

\_\_\_\_\_ Hours (include any stops made en route)

3. If you drove, how many other hunters were in the vehicle?

\_\_\_\_\_ Number of other hunters

4. About how much did you personally spend on this trip? If you can't recall the exact amount, please give your best estimate for each of the following three types of expenses.

Amount I spent for transportation (gas, car rental, airfare and any other transportation costs)

\_\_\_\_\_ Amount I spent on food, beverages, and lodging

Amount I spent on equipment purchased just for this trip, access or guide fees, and all other expenses

\_\_\_\_\_ TOTAL AMOUNT I SPENT ON THIS HUNTING TRIP

5. Was this trip worth more than you actually spent?

\_\_\_\_\_ Yes \_\_\_\_\_ No

6. If YES, would you still have made the trip if your share of the expenses had been 1400 more?

\_\_\_\_\_ Yes \_\_\_\_\_ No

7. What is the maximum increase in your actual trip cost you would have paid to hunt this specific area instead of hunting elsewhere?

\_\_\_\_\_ Dollars

8. If your answer was zero, could you briefly explain why?

9. Imagine that everything about this last trip were the same, except that your chance of getting a 6-point or better bull elk was twice as great AND that your trip costs were 2500 more than your actual costs. Would you still have made the trip under these circumstances? (please check one)

\_\_\_\_\_ Yes, I would still have made the trip

\_\_\_\_\_ No, I would not have made the trip

10. What is the maximum increase in actual trip costs you would pay to double your chances of getting a 6-point or better bull elk?

\_\_\_\_\_ Dollars increase in trip cost

11. If your answer was zero, could you briefly explain why?

12. Imagine that everything about this last trip were the same, except that you saw half as many hunters as you actually did AND your trip costs were 1500 more than they actually were. Would you still have made the trip under these circumstances? (please check one)

\_\_\_\_\_ Yes, I would still have made the trip

\_\_\_\_\_ No, I would not have made the trip

13. What is the maximum increase in actual trip costs you would pay to reduce by half the number of hunters you saw while hunting in this area?

\_\_\_\_\_ Dollars increase in trip cost

14. If your answer was zero, could you briefly explain why?

IV. THE NEXT FEW QUESTIONS ASK YOUR OPINION ON DIFFERENT STATEWIDE HUNTING MANAGEMENT OPTIONS.

1. Managing for a diversity of opportunities to hunt elk may require more hunting regulations. However, these regulations would restrict your hunting opportunities. We'd like to know your opinions on the following types of potential regulations to maintain a diversity of hunting opportunities in Montana.

For each regulation, circle the answer showing whether you favor that regulation, do not favor it but would accept it if necessary, do not find the regulation acceptable, or would need more information to decide.



A. No special permit to hunt bull elk would be needed. There would be considerable competition for bull elk but no restrictions other than having a license. You could hunt every year but your odds of getting a bull would be less than 1 in 10.  
Please circle one:

Favor Do not favor but Would not Would need more  
would accept it accept it information

B. An unlimited number of bull elk permits would be available. You would be able to get a permit every year but you would have to choose the one district where you would hunt and not be able to hunt in any other districts. Please circle one:

Favor Do not favor but Would not Would need more  
would accept it accept it information

C. A limited number of bull elk permits would be available through a drawing in June. You would have to choose the one district where you would hunt and not be able to hunt in any other districts. You might get a permit only once every 3 years, but if you did obtain a permit you would have a much better chance (than 1 in 10) of getting a bull. Please circle one:

Favor Do not favor but Would not Would need more  
would accept it accept it information

D. The taking of bull elk would be subject to point regulations. Hunters could shoot only bulls that had at least one antler with 2 or more points. Please circle one:

Favor Do not favor but Would not Would need more  
would accept it accept it information

E. The taking of bull elk would be subject to point regulations. Hunters could shoot only bulls that had at least one antler with 5 or more points. Please circle one:

Favor Do not favor but Would not Would need more  
would accept it accept it information

F. To reduce pressure on bulls, antlerless elk permit holders would be allowed to hunt only antlerless elk and only in the hunting district where their permit was valid. Please circle one:

Favor Do not favor but Would not Would need more  
would accept it accept it information

V. THESE LAST FEW QUESTIONS WILL HELP US UNDERSTAND YOUR RESPONSES BY KNOWING SOME BASIC INFORMATION ABOUT YOU.

1. Where are you from? City: \_\_\_\_\_ State: \_\_\_\_\_

2. What is your age? \_\_\_\_\_ Years

3. Are you: \_\_\_\_\_ Male \_\_\_\_\_ Female

4. Are you a member of any hunting, conservation, or sport organizations? \_\_\_\_\_ Yes \_\_\_\_\_ No

5. If so, which ones?

6. What is the highest year of formal education you completed?

\_\_\_\_\_ Some grade school \_\_\_\_\_ Some college  
\_\_\_\_\_ Finished grade school \_\_\_\_\_ Finished college  
\_\_\_\_\_ Finished junior high school \_\_\_\_\_ Some postgraduate work  
\_\_\_\_\_ Finished high school \_\_\_\_\_ Finished postgraduate

7. If you had not gone hunting this trip, would you have been working instead?

\_\_\_\_\_ Yes \_\_\_\_\_ No

8. During the hunting season this year, were you: (check one)

\_\_\_\_\_ Employed full time \_\_\_\_\_ Retired  
\_\_\_\_\_ Employed part time \_\_\_\_\_ Homemaker  
\_\_\_\_\_ Unemployed \_\_\_\_\_ Other: \_\_\_\_\_

9. Please check your household's income before taxes last year:

\_\_\_\_\_ Under 5,000 \_\_\_\_\_ 20,000 - 24,999 \_\_\_\_\_ 40,000 - 49,000  
\_\_\_\_\_ 5,000 - 9,999 \_\_\_\_\_ 25,000 - 29,999 \_\_\_\_\_ 50,000 - 74,999  
\_\_\_\_\_ 10,000 - 14,999 \_\_\_\_\_ 30,000 - 34,999 \_\_\_\_\_ 75,000 - 100,000  
\_\_\_\_\_ 15,000 - 19,999 \_\_\_\_\_ 35,000 - 39,999 \_\_\_\_\_ over 100,000



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V001 1-4  
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V003 7-9  
V004 10-12  
V005 13  
V006 14-15  
V007 16-17  
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V009 20-21  
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V011 24-25  
V012 26-27  
V013 28  
V014 29  
V015 30  
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V017 32-34  
V018 35  
V019 36  
V020 37  
V021 38-40  
V022 41-43  
V023 44-46  
V024 47  
V025 48  
V026 49  
V027 50-51  
V028 52-53  
V029 54-55  
V030 56-57  
V031 58-59  
V032 60-61  
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V034 64-65  
V035 66-67  
V036 68-69  
V037 70-71  
V038 72-73  
V039 74-75  
V040 76-77  
V041 78  
V042 79  
V043 80-81  
V044 82  
V045 83-84  
V046 85  
V047 86  
V048 87  
V049 88  
V050 89-90  
V051 91  
V052 92  
V053 93-95  
V054 96-98

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A1 UNIVERSITY OF IDAHO

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V094 182-185  
V095 186  
V096 187-190  
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V098 193  
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V101 196  
V102 197  
V103 198  
V104 199-212 (A)  
V105 213-214 (A)  
V106 215-216  
V107 217  
V108 218  
V109 219-267 (A)

V110 368-316 (A)  
 V111 317-365 (A)  
 V112 366  
 V113 367  
 V114 368  
 V115 369-370  
 V116 371  
 VARIABLE LABELS  
 V001 SURVEY NO.  
 V002 YEARS HUNTED  
 V003 YEARS PER YEAR HUNTED  
 V004 DAYS HUNTED IN MONTANA  
 V005 DAYS HUNTED IN MONTANA  
 V006 RATE ELK HUNTING  
 V007 MONTH OF THIS TRIP  
 V008 DAY OF THIS TRIP  
 V009 YEAR OF THIS TRIP  
 V010 HUNTING AREA  
 V011 DAYS HUNTED  
 V012 HOURS PER DAY HUNTED  
 V013 # ELK SIGHTED  
 V014 KILLED AN ELK?  
 V015 TYPE OF ELK  
 V016 SIDE 1 POINTS  
 V017 SIDE 2 POINTS  
 V018 DISTRICT # OF HILL  
 V019 OTHER GAME KILLED?  
 V020 SPECIES  
 V021 ONLY AREA HUNTED IN?  
 V022 AREA 1 #  
 V023 AREA 2 #  
 V024 AREA 3 #  
 V025 TYPE OF WEAPON  
 V026 OUTFITTER OR GUIDE USED?  
 V027 HUNTING MAIN PURPOSE?  
 V028 DIRT BIKE/ATV  
 V029 HORSE  
 V030 BINOCULARS  
 V031 TOPO MAPS  
 V032 BACKPACKING TENT  
 V033 TRAILER  
 V034 WALL TENT  
 V035 SNOWMOBILE  
 V036 ELK BUGLE  
 V037 CAMERA  
 V038 SPOTTING SCOPE  
 V039 MOTOR HOME  
 V040 MILES WALKED  
 V041 # OTHERS SEEN  
 V042 EXPECTATIONS OF #S  
 V043 AFFECTED ENJOYMENT  
 V044 HOW AFFECTED  
 V045 FIRST TIME IN AREA  
 V046 # YEARS HUNTED HERE  
 V047 COMPARE TO OTHER AREAS  
 V048 FEELINGS ABOUT ROAD ACCESS

V048 'CHANGES IN ROAD ACCESS'  
 V049 'ROAD MANAGEMENT'  
 V050 '# TRIP'S HERE THIS YEAR'  
 V051 'FUTURE HUNT FREQUENCY'  
 V052 'ANY COMPARABLE AREAS?'  
 V053 'COMPARABLE AREA 1.'  
 V054 'COMPARABLE AREA 2.'  
 V055 'COMPARABLE AREA 3.'  
 V056 'ALTERNATE AREA #'  
 V057 'DISTANCE TO ALT AREA'  
 V058 'ALT AREA HUNT QUALITY'  
 V059 'GOOD ROAD ACCESS'  
 V060 'SOLITUDE'  
 V061 'MANY ELK'  
 V062 'TEST HUNTING SKILLS'  
 V063 'CLOSE TO HOME'  
 V064 'TROPHY ELK'  
 V065 'TO BE OUTDOORS'  
 V066 'PAST HUNTING GOOD HERE'  
 V067 'FOR THE MEAT'  
 V068 'VIEW SCENERY'  
 V069 'SPECIAL PERMIT FOR AREA'  
 V070 'BE IN A NATURAL SETTING'  
 V071 'HUNT WITH FAMILY MEMBERS'  
 V072 'PREINDS WERE GOING'  
 V073 'ESCAPE OTHER HUNTERS'  
 V074 'BE IN RUGGED COUNTRY'  
 V075 'MOST IMPORTANT REASON A'  
 V076 'MOST IMPORTANT REASON B'  
 V077 'MOST IMPORTANT REASON C'  
 V078 'DISTANCE FROM HOME THIS TRIP'  
 V079 'TRAVEL TIME THIS TRIP'  
 V080 '# IN VEHICLE THIS TRIP'  
 V081 'TRANSPORTATION COSTS THIS TRIP'  
 V082 'FOOD AND LODGING COSTS THIS TRIP'  
 V083 'EQUIPMENT FEES ETC COST THIS TRIP'  
 V084 'TOTAL COST OF THIS TRIP'  
 V085 'TRIP WORTH MORE THAN ACTUAL EXPENSES?'  
 V086 'WOULD HAVE HUNTED AT \$ ?'  
 V087 'YES/NO'  
 V088 'MAX \$ LIMIT FOR THIS AREA'  
 V089 'REASON FOR 0 \$'  
 V090 'HUNT AT BETTER ODDS AND >\$ ?'  
 V091 'YES/NO'  
 V092 'MAX \$ FOR BETTER ODDS'  
 V093 'REASON FOR 0 \$'  
 V094 'HALF AS CROWDED AND >\$ ?'  
 V095 'YES/NO'  
 V096 'YOUR COST FOR REDUCED CROWDING'  
 V097 'REASON FOR 0 \$'  
 V098 'NO SPECIAL ELK PERMIT'  
 V099 'UNLIMITED PERMITS FOR ONE AREA'  
 V100 'UNLIMITED PERMITS FOR ONE AREA'  
 V101 'TWO POINT REGULATIONS'  
 V102 'FIVE POINT REGULATIONS'

V103 'ANTLERLESS ELK BY DISTRICT'  
 V104 'CITY OF RESIDENCE.'  
 V105 'STATE OF RESIDENCE.'  
 V106 'AGE IN YEARS'  
 V107 'GENDER'  
 V108 'MEMBER OF CLUB, ORGANIZATION'  
 V109 'NAME OF CLUB A.'  
 V110 'NAME OF CLUB B.'  
 V111 'NAME OF CLUB C.'  
 V112 'EDUCATIONAL LEVEL'  
 V113 'IF NOT HUNTING WOULD HAVE WORKED?'  
 V114 'EMPLOYMENT STATUS'  
 V115 'HOUSEHOLD INCOME'  
 V116 'ADDITIONAL COMMENTS'  
 VALUE LABELS  
 V005 1 'FAVORITE.'  
 2 'ONE OF FAVORITE.'  
 3 'ONE OF MANY.'  
 4 'PREFER OTHER' /  
 V009 1 'LIBBY.'  
 2 'BOB MARSHALL.'  
 3 'AUGUSTIA.'  
 4 'SUPERIOR.'  
 5 'FLINT CREEK.'  
 6 'BUTTE.'  
 7 'TOWNSEND.'  
 8 'LITTLE BELTS.'  
 9 'PIONEERS.'  
 10 'TOBACCO ROOTS.'  
 11 'BRIDGERS.'  
 12 'TENDONS.'  
 13 'GRAVELLYS.'  
 14 'MADISON'S.'  
 15 'GARDINER.'  
 16 'ABSAROKAS' /  
 17 'YES.'  
 V013 1 'NO' /  
 2 'ANTLERED.'  
 V014 1 'ANTLERLESS' /  
 2 'YES.'  
 V018 1 'NO' /  
 2 'MULE' /  
 3 'DEER' /  
 4 'WTD.'  
 V020 'BEAR' /  
 2 'OTHER' /  
 3 'MAIN AREA.'  
 V024 1 'HUNTED OTHERS' /  
 2 'MUZZLE LOAD' /  
 3 'RIFLE' /  
 4 'BOW & ARROW' /  
 V025 1 'YES' /  
 2 'NO' /  
 V026 1 'HUNTING' /  
 2 'SEVERAL' /  
 V027 TO V039 1 'USED'

V041	9	NOT USED'/'
	1	'MORE THAN'
	2	'AS EXPECTED'
	3	'FEWER THAN'
V042	4	'NO EXPECTATIONS'/'
	1	'YES'
V043	2	'NO'/'
	1	'COMPETE'
	2	'IMPAIRS'
	3	'NOISE VISUAL'
	4	'< SOLITUDE'
	5	'ROAD HUNTING'
	6	'<SPACE>'PEOPLE'
	7	'POSITIVE'
	8	'OTHER'
V044	9	'NO RESPONSE'/'
	1	'FIRST TIME'
V046	2	'HERE BEFORE'/'
	1	'FAVORITE'
	2	'ONE OF FAVORITE'
	3	'ONE OF MANY'
V047	4	'PREFER OTHER'/'
	1	'TOO FEW'
	2	'ABOUT RIGHT'
	3	'TOO MANY'/'
V048	1	'INCREASED'
	2	'DECREASED'
	3	'NO CHANGE'
V049	4	'NOT SURE'/'
	1	'OPEN ONLY'
	2	'CLOSED OK'
	3	'OFF ROAD OK'/'
V051	1	'SAME AS'
	2	'MORE THAN'
V052	3	'LESS THAN'/'
	1	'YES'
V058	2	'NO'/'
	1	'MUCH WORSE'
	2	'WORSE'
	3	'COMPARABLE'
	4	'BETTER'
	5	'EXCELLENT'
	6	'NON-HUNT BETTER'
	7	'NON-HUNT WORSE'
	8	'TRADE-OFF MADE'
	9	'NO RESPONSE'/'
V059	10	'V074 1'V IMPORTANT'
	1	'IMPORTANT'
	2	'NOT VERY'
	3	'NOT AT ALL'
	4	'NOT SURE'/'
V075	10	'V077 1'ROAD ACCESS'
	1	'SOLITUDE'
	2	'MANY ELK'
	3	'TEST SKILLS'
	4	



5	'CLOSE TO HOME'
6	'TROPHY ELK'
7	'BE OUTDOORS'
8	'FAST SUCCESS'
9	'FOR MEAT'
10	'SCENERY'
11	'HAD PERMIT'
12	'NATURAL SETTING'
13	'WITH FAMILY'
14	'FRIENDS'
15	'ESCAPE HUNTERS'
16	'RUGGED COUNTRY' /
V085	V087 V091 V095 1 'YES'
	'NO' /
V089	'NOT AFFORD COST'
	'HUNT ELSEWHERE'
	'TAXPAYER'
	'OPPOSE FEE HUNTING'
	'DONT UNDERSTAND Q'
	'LIVE CLOSE BY'
	'HUNTING BAD HERE'
	'OTHER'
	'NO RESPONSE #6 YES'
	'NO RESPONSE #6 NO' /
V090	'YES'
	'NO' /
V093	'NOT AFFORD > COST'
	'HUNT ELSEWHERE'
	'TAXPAYER'
	'OPPOSE FEE HUNTING'
	'DONT UNDERSTAND Q'
	'LIVE CLOSE BY'
	'6 PT NOT IMPORTANT'
	'OTHER'
	'NO RESPONSE #9 YES'
	'NO RESPONSE #9 NO' /
V094	'YES'
	'NO' /
V097	'NOT AFFORD > COST'
	'HUNT ELSEWHERE'
	'TAXPAYER'
	'OPPOSE FEE HUNTING'
	'DONT UNDERSTAND Q'
	'SAW FEW OTHERS'
	'FEW NOT IMPORTANT'
	'OTHER'
	'NO RESPONSE #12 YES'
	'NO RESPONSE #12 NO' /
V098	V103 1 'FAVOR'
	'ACCEPT'
	'NOT ACCEPT'
	'MORE INFO' /
V107	'MALE'
	'FEMALE' /
V108	'NO RESPONSE'

V112	1	YES
	2	NO
	3	SOME GRADE SCHOOL
	4	GRADE SCHOOL
	5	JR HIGH SCHOOL
	6	HIGH SCHOOL
	7	SOME COLLEGE
	8	COLLEGE
	9	SOME POSTGRAD
V113	1	POSTGRAD
	2	YES
V114	1	NO
	2	FULL TIME
	3	PART TIME
	4	UNEMPLOYED
	5	RETIRED
	6	HOMEMAKER
V115	1	OTHER
	2	< 5000
	3	5-9999
	4	10-14999
	5	15-19999
	6	20-24999
	7	25-29999
	8	30-34999
	9	35-39999
	10	40-49999
	11	50-74999
	12	75-100000
V116	1	>100,000
	2	YES
	3	NO

**Montana Department  
of  
Fish, Wildlife & Parks**



February 17, 1987

Dear Montana Elk Hunter:

About three weeks ago, I wrote asking about the most recent elk hunting trip you took during the 1986 general hunting season in Montana. As of today, we have not yet received your completed questionnaire.

The survey information will be used to make decisions about future elk and hunting management in Montana. We believe that hunters' opinions should be an important consideration in these management decisions.

I'm writing again because it's important that each questionnaire be complete. This survey was mailed to only five percent of the people who hunted elk in Montana last season. For our results to be representative, we need to hear from you even if you only hunted once last season.

Another copy of the questionnaire is provided in case the original one has been misplaced. We think you'll enjoy completing the survey; we have yet to meet a hunter who doesn't like to think about hunting or doesn't have an opinion on how elk should be managed!

Most of the questions ask about the most recent hunting trip you took in Montana during the general season. So you can tell us where you hunted on that trip, the back of this letter contains a map of hunting areas; please keep it handy.

The survey should take about 15-20 minutes to complete, and we've included a stamped, addressed return envelope for your convenience. Your identity will be confidential because your name will not be associated with your responses.

Thanks for your help. If you'd like a summary of the results of this study, please write your name and address on the return envelope (not on the questionnaire) and I'll make sure you get one. If you have any questions, please call (406) 994-6364.

Sincerely,

Pat Graham  
Study Director

THE UNIVERSITY OF CHICAGO  
THE EAST ASIAN LIBRARY  
540 EAST 57TH STREET  
CHICAGO, ILL. 60637

1. The first part of the paper discusses the general situation of the East Asian library at the University of Chicago. It describes the collection, the staff, and the facilities. It also mentions the library's participation in the International Association of Agricultural Librarians and Documentalists (IAALD) and the International Association of University Libraries (IAUL).

2. The second part of the paper discusses the collection of the East Asian library. It describes the scope of the collection, the sources of the books, and the methods of acquisition. It also mentions the library's participation in the International Association of Agricultural Librarians and Documentalists (IAALD) and the International Association of University Libraries (IAUL).

3. The third part of the paper discusses the staff of the East Asian library. It describes the qualifications of the staff, the methods of recruitment, and the methods of training. It also mentions the library's participation in the International Association of Agricultural Librarians and Documentalists (IAALD) and the International Association of University Libraries (IAUL).

4. The fourth part of the paper discusses the facilities of the East Asian library. It describes the building, the equipment, and the services. It also mentions the library's participation in the International Association of Agricultural Librarians and Documentalists (IAALD) and the International Association of University Libraries (IAUL).

5. The fifth part of the paper discusses the participation of the East Asian library in the International Association of Agricultural Librarians and Documentalists (IAALD) and the International Association of University Libraries (IAUL). It describes the library's activities in these organizations and the results of these activities. It also mentions the library's participation in the International Association of Agricultural Librarians and Documentalists (IAALD) and the International Association of University Libraries (IAUL).

## APPENDIX B

### KEY VARIABLES REPORTED BY STUDY AREA





Table B-1. Hunters' residence, by area (in percent).

Area	Area No.	Montana	Other	Number of Respondents (Percentage of Total)
Libby	1	69	31	267 ( 9 )
Bob Marshall	13	56	44	109 ( 4 )
Augusta	14	65	35	248 ( 8 )
Superior	19	82	18	240 ( 8 )
Flint Creek	20	81	18	336 ( 11 )
Butte	24	86	14	108 ( 3 )
Townsend	25	76	23	200 ( 6 )
Little Belt Mtns.	26	71	29	69 ( 2 )
Pioneer Mtns.	30	68	32	284 ( 9 )
Tobacco Root Mtns.	31	69	31	182 ( 6 )
Bridger Mtns.	32	70	30	113 ( 4 )
Tendoy Mtns.	38	61	39	79 ( 3 )
Gravelly Mtns.	39	63	37	146 ( 5 )
Madison Mtns.	40	58	42	271 ( 9 )
Gardiner	41	58	42	293 ( 10 )
Absaroka Mtns.	42	67	33	112 ( 4 )
TOTAL PERCENTAGE		69	31	( 100 )

Table B-2. How elk hunting compares to hunters' other recreational activities, by area (in percent).

Area	Area No.	Favorite Activity	One of Favorite Activities	One of Many Activities I Do	Prefer Other Activities	Number of Respondents (Percentage of Total)
Libby	1	9	53	35	3	266 ( 9 )
Bob Marshall	13	16	42	43		108 ( 3 )
Augusta	14	14	48	36	2	247 ( 8 )
Superior	19	23	45	31	4	239 ( 8 )
Flint Creek	20	18	45	35	1	335 ( 11 )
Butte	24	15	52	30	3	107 ( 3 )
Townsend	25	16	47	35	1	198 ( 6 )
Little Belt Mtns.	26	22	49	25	4	69 ( 2 )
Pioneer Mtns.	30	21	50	29	4	284 ( 9 )
Tobacco Root Mtns.	31	13	54	31	2	181 ( 6 )
Bridger Mtns.	32	7	45	47	1	111 ( 4 )
Tendoy Mtns.	38	23	45	31	1	78 ( 3 )
Gravelly Mtns.	39	21	48	28	3	145 ( 5 )
Madison Mtns.	40	16	53	30	1	271 ( 9 )
Gardiner	41	14	49	36	1	293 ( 10 )
Absaroka Mtns.	42	12	46	38	3	112 ( 4 )
TOTAL PERCENTAGE		16	48	34	2	( 100 )

Table B-3. Level of previous experience hunting in this area, by area (in percent).

Area	Area No.	First Time Here	Have Hunted Here Before	Number of Respondents (Percentage of Total)
Libby	1	29	71	266 ( 9 )
Bob Marshall	13	36	64	109 ( 4 )
Augusta	14	35	65	246 ( 8 )
Superior	19	23	77	239 ( 8 )
Flint Creek	20	26	74	332 ( 11 )
Butte	24	21	79	108 ( 4 )
Townsend	25	25	74	196 ( 6 )
Little Belt Mtns.	26	35	65	69 ( 2 )
Pioneer Mtns.	30	26	74	282 ( 9 )
Tobacco Root Mtns.	31	30	70	180 ( 6 )
Bridger Mtns.	32	39	61	113 ( 4 )
Tendoy Mtns.	38	22	78	76 ( 2 )
Gravelly Mtns.	39	28	72	146 ( 5 )
Madison Mtns.	40	41	59	269 ( 9 )
Gardiner	41	43	57	290 ( 10 )
Absaroka Mtns.	42	39	61	107 ( 3 )
TOTAL PERCENTAGE		31	69	( 100 )

Table B-4. Use of a guide or outfitter, by area (in percent).

Area	Area No.	Guide or Outfitter Used	Guide or Outfitter Not Used	Number of Respondents (Percentage of Total)
Libby	1	7	92	267 ( 9 )
Bob Marshall	13	30	70	109 ( 4 )
Augusta	14	12	88	246 ( 8 )
Superior	19	4	96	240 ( 8 )
Flint Creek	20	5	95	333 ( 11 )
Butte	24	2	98	108 ( 4 )
Townsend	25	4	95	198 ( 6 )
Little Belt Mtns.	26	13	87	69 ( 2 )
Pioneer Mtns.	30	8	92	281 ( 9 )
Tobacco Root Mtns.	31	3	97	181 ( 6 )
Bridger Mtns.	32	13	87	112 ( 4 )
Tendoy Mtns.	38	9	91	78 ( 3 )
Gravelly Mtns.	39	5	95	146 ( 5 )
Madison Mtns.	40	18	82	270 ( 9 )
Gardiner	41	29	71	289 ( 9 )
Absaroka Mtns.	42	13	87	109 ( 4 )
TOTAL PERCENTAGE		11	89	( 100 )

Table B-5. Proportion of hunters who harvested an elk, by area (in percent).

Area	Area No.	Elk Harvested	No Elk Harvested	Number of Respondents (Percentage of Total)
Libby	1	11	89	266 ( 9 )
Bob Marshall	13	13	87	109 ( 4 )
Augusta	14	17	83	246 ( 8 )
Superior	19	19	81	240 ( 8 )
Flint Creek	20	17	83	334 ( 11 )
Butte	24	12	88	107 ( 3 )
Townsend	25	13	86	200 ( 7 )
Little Belt Mtns.	26	32	68	69 ( 2 )
Pioneer Mtns.	30	19	81	280 ( 9 )
Tobacco Root Mtns.	31	16	84	182 ( 6 )
Bridger Mtns.	32	23	77	113 ( 4 )
Tendoy Mtns.	38	27	73	79 ( 3 )
Gravelly Mtns.	39	15	85	145 ( 5 )
Madison Mtns.	40	19	81	270 ( 9 )
Gardiner	41	31	69	290 ( 9 )
Absaroka Mtns.	42	13	87	111 ( 4 )
TOTAL PERCENTAGE		18	82	( 100 )

Table B-6. Type of elk harvested, by area (in percent).

Area	Area No.	Antlered	Antlerless	Number of Respondents (Percentage of Total)
Libby	1	63	37	30 ( 5 )
Bob Marshall	13	71	29	14 ( 2 )
Augusta	14	33	67	43 ( 7 )
Superior	19	91	8	47 ( 8 )
Flint Creek	20	90	10	58 ( 10 )
Butte	24	85	15	13 ( 2 )
Townsend	25	85	15	27 ( 5 )
Little Belt Mtns.	26	68	32	22 ( 4 )
Pioneer Mtns.	30	91	9	55 ( 10 )
Tobacco Root Mtns.	31	97	3	30 ( 5 )
Bridger Mtns.	32	96	4	26 ( 5 )
Tendoy Mtns.	38	100		21 ( 4 )
Gravelly Mtns.	39	91	9	22 ( 4 )
Madison Mtns.	40	78	22	54 ( 9 )
Gardiner	41	78	22	94 ( 16 )
Absaroka Mtns.	42	71	29	14 ( 2 )
TOTAL PERCENTAGE		80	20	( 100 )



Table B-7. Number of points on side 1 for elk harvested, by area (in percent)

Area	Area No.	Number of Points							Number of Respondents (Percentage of Total)
		1	2	3	4	5	6	7	
Libby	1	32	10	5	5	16	32		19 ( 4 )
Bob Marshall	13	10	10	10			60	10	10 ( 2 )
Augusta	14	36	7	7		29	21		14 ( 3 )
Superior	19	43	9	5	12	19	12		42 ( 9 )
Flint Creek	20	53	9		6	19	11	2	53 ( 12 )
Butte	24	54	9	9	9	9	9		11 ( 2 )
Townsend	25	52	13		9	13	13		23 ( 5 )
Little Belt Mtns.	26	43	21		7	21	7		14 ( 3 )
Pioneer Mtns.	30	39	6	6	8	27	10	4	51 ( 11 )
Tobacco Root Mtns.	31	11	29	18	18	21	4		28 ( 6 )
Bridger Mtns.	32	20	28	8	4	24	16		25 ( 5 )
Tendoy Mtns.	38	43	9	9		33	5		21 ( 5 )
Gravelly Mtns.	39	19	19	5	9	33	14		21 ( 5 )
Madison Mtns.	40	15	5	5	24	29	22		41 ( 9 )
Gardiner	41	24	1	1	10	26	37		72 ( 16 )
Absaroka Mtns.	42	30	30	10			30		10 ( 2 )
TOTAL PERCENTAGE		33	11	5	9	23	18	.9	( 100 )

Table B-9. How the hunting area compared to other elk hunting locations in Montana, by area (in percent).

Area	Area No.	Favorite Place	One of Favorite Places	One of Many Places I Hunt	Prefer to Hunt Other Places	Number of Respondents (Percentage of Total)
Libby	1	25	35	33	7	250 ( 9 )
Bob Marshall	13	34	43	17	6	95 ( 3 )
Augusta	14	24	37	27	13	228 ( 8 )
Superior	19	34	37	24	6	228 ( 8 )
Flint Creek	20	24	45	25	5	325 ( 11 )
Butte	24	28	41	22	9	103 ( 4 )
Townsend	25	21	42	29	8	187 ( 6 )
Little Belt Mtns.	26	26	38	33	3	66 ( 2 )
Pioneer Mtns.	30	30	39	25	5	271 ( 9 )
Tobacco Root Mtns.	31	30	41	21	8	171 ( 6 )
Bridger Mtns.	32	27	34	29	9	105 ( 4 )
Tendoy Mtns.	38	28	47	24	1	76 ( 3 )
Gravelly Mtns.	39	31	44	17	9	137 ( 5 )
Madison Mtns.	40	25	39	26	10	247 ( 9 )
Gardiner	41	30	30	25	15	272 ( 9 )
Absaroka Mtns.	42	16	40	24	19	103 ( 4 )
TOTAL PERCENTAGE		27	39	25	9	(100)

Table B-12. Hunters' perceptions of recent changes in the number of open roads, by area (in percent).

Area	Area No.	Number Has Increased	Number Has Decreased	Number Has Not Changed	Not Sure	Number of Respondents (Percentage of Total)
Libby	1	19	37	15	28	262 ( 9 )
Bob Marshall	13	6	13	46	34	96 ( 3 )
Augusta	14	3	22	45	30	229 ( 8 )
Superior	19	26	22	32	20	237 ( 8 )
Flint Creek	20	20	25	30	24	331 ( 11 )
Butte	24	18	28	35	19	106 ( 4 )
Townsend	25	8	26	34	32	195 ( 7 )
Little Belt Mtns.	26	9	19	34	38	68 ( 2 )
Pioneer Mtns.	30	21	33	26	20	275 ( 9 )
Tobacco Root Mtns.	31	8	40	27	25	178 ( 6 )
Bridger Mtns.	32	12	12	37	38	113 ( 4 )
Tendoy Mtns.	38	21	36	21	22	77 ( 3 )
Gravelly Mtns.	39	3	39	31	27	143 ( 5 )
Madison Mtns.	40	9	14	34	43	264 ( 9 )
Gardiner	41	7	6	47	40	285 ( 10 )
Absaroka Mtns.	42	7	11	49	32	107 ( 4 )
TOTAL PERCENTAGE		13	24	33	29	( 100 )

Table B-13. Hunters' preferences for road management to retrieve game with vehicles, by area (in percent).

Area	Area No.	Use Open Roads Only	OK to Use Closed Roads	OK to Travel Off Roads	Number of Respondents (Percentage of Total)
Libby	1	49	43	8	260 ( 9 )
Bob Marshall	13	70	29	1	87 ( 3 )
Augusta	14	58	25	17	233 ( 8 )
Superior	19	62	29	9	231 ( 8 )
Flint Creek	20	52	36	11	324 ( 11 )
Butte	24	46	32	22	107 ( 4 )
Townsend	25	46	28	26	194 ( 7 )
Little Belt Mtns.	26	51	19	29	68 ( 2 )
Pioneer Mtns.	30	41	40	19	279 ( 9 )
Tobacco Root Mtns.	31	47	36	17	181 ( 6 )
Bridger Mtns.	32	60	26	14	107 ( 4 )
Tendoy Mtns.	38	42	20	38	79 ( 3 )
Gravelly Mtns.	39	48	30	22	143 ( 5 )
Madison Mtns.	40	60	26	14	265 ( 9 )
Gardiner	41	62	23	14	285 ( 10 )
Absaroka Mtns.	42	63	18	19	108 ( 4 )
TOTAL PERCENTAGE		53	31	16	( 100 )

Table B-14. Hunters' reactions to unlimited elk permits (and reduced bull chances), by area (in percent).

Area	Area No.	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Libby	1	37	25	15	23	256 ( 9 )
Bob Marshall	13	30	25	16	29	107 ( 4 )
Augusta	14	29	25	20	26	243 ( 8 )
Superior	19	43	19	18	20	234 ( 8 )
Flint Creek	20	41	24	15	20	327 ( 11 )
Butte	24	38	23	17	22	108 ( 4 )
Townsend	25	36	25	17	21	198 ( 7 )
Little Belt Mtns.	26	37	21	19	22	67 ( 2 )
Pioneer Mtns.	30	33	24	18	25	278 ( 9 )
Tobacco Root Mtns.	31	28	27	20	25	176 ( 6 )
Bridger Mtns.	32	33	19	21	27	106 ( 4 )
Tendoy Mtns.	38	29	27	20	23	78 ( 3 )
Gravelly Mtns.	39	33	29	15	23	142 ( 5 )
Madison Mtns.	40	33	22	27	18	262 ( 9 )
Gardiner	41	24	23	28	25	284 ( 9 )
Absaroka Mtns.	42	21	26	38	15	111 ( 4 )
TOTAL PERCENTAGE		33	24	20	23	( 100 )

Table B-15. Hunters' reactions to unlimited permits but with mandatory choice of only one hunting district, by area (in percent).

Area	Area No.	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Libby	1	17	34	39	10	258 ( 9 )
Bob Marshall	13	23	34	29	14	105 ( 3 )
Augusta	14	21	34	33	11	241 ( 8 )
Superior	19	23	31	36	10	236 ( 8 )
Flint Creek	20	21	33	37	9	327 ( 11 )
Butte	24	17	36	42	5	107 ( 4 )
Townsend	25	18	27	43	10	200 ( 7 )
Little Belt Mtns.	26	18	34	41	7	68 ( 2 )
Pioneer Mtns.	30	19	32	40	9	277 ( 9 )
Tobacco Root Mtns.	31	20	35	33	12	172 ( 6 )
Bridger Mtns.	32	18	39	34	8	109 ( 4 )
Tendoy Mtns.	38	19	37	29	14	78 ( 3 )
Madison Mtns.	40	21	34	34	11	265 ( 9 )
Gardiner	41	19	34	33	14	286 ( 10 )
Absaroka Mtns.	42	25	29	38	8	112 ( 4 )
TOTAL PERCENTAGE		20	33	36	11	( 100 )



Table B-16. Hunters' reactions to limited permits (and increased bull elk chances), by area (in percent).

Area	Area No.	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Libby	1	10	22	61	7	259 ( 9 )
Bob Marshall	13	10	25	51	13	107 ( 4 )
Augusta	14	15	21	54	10	242 ( 8 )
Superior	19	8	19	65	8	232 ( 8 )
Flint Creek	20	8	22	62	8	328 ( 11 )
Butte	24	14	14	58	14	108 ( 4 )
Townsend	25	13	19	53	14	200 ( 7 )
Little Belt Mtns.	26	12	18	66	4	67 ( 2 )
Pioneer Mtns.	30	9	18	63	10	281 ( 9 )
Tobacco Root Mtns.	31	17	21	55	7	173 ( 6 )
Bridger Mtns.	32	13	27	52	8	109 ( 4 )
Tendoy Mtns.	38	6	17	68	9	78 ( 3 )
Gravelly Mtns.	39	17	13	57	13	143 ( 5 )
Madison Mtns.	40	14	21	59	6	265 ( 9 )
Gardiner	41	18	19	50	13	283 ( 9 )
Absaroka Mtns.	42	20	19	45	15	112 ( 4 )
TOTAL PERCENTAGE		13	20	58	10	( 100 )

Table B-17. Hunters' reactions to two-point regulations, by area (in percent).

Area	Area No.	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Libby	1	35	36	23	6	259 ( 9 )
Bob Marshall	13	48	28	11	12	106 ( 3 )
Augusta	14	46	30	13	11	243 ( 8 )
Superior	19	31	38	24	7	235 ( 8 )
Flint Creek	20	46	33	18	3	326 ( 11 )
Butte	24	52	24	20	4	108 ( 4 )
Townsend	25	45	29	18	7	200 ( 7 )
Little Belt Mtns.	26	42	42	14	1	66 ( 2 )
Pioneer Mtns.	30	41	33	17	9	279 ( 9 )
Tobacco Root Mtns.	31	60	25	12	3	174 ( 6 )
Bridger Mtns.	32	37	33	23	7	109 ( 4 )
Tendoy Mtns.	38	45	37	10	8	78 ( 3 )
Gravelly Mtns.	39	52	32	13	3	142 ( 5 )
Madison Mtns.	40	54	24	13	9	265 ( 9 )
Gardiner	41	44	31	17	8	288 ( 10 )
Absaroka Mtns.	42	48	22	22	9	111 ( 4 )
TOTAL PERCENTAGE		45	31	17	7	( 100 )

Table B-18. Hunters' reactions to five-point regulations, by area (in percent).

Area	Area No.	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Libby	1	10	23	60	7	260 ( 9 )
Bob Marshall	13	16	32	42	10	107 ( 4 )
Augusta	14	13	26	52	9	244 ( 8 )
Superior	19	11	17	66	5	235 ( 8 )
Flint Creek	20	11	23	59	7	327 ( 11 )
Butte	24	11	24	61	4	107 ( 4 )
Townsend	25	6	28	60	5	200 ( 7 )
Little Belt Mtns.	26	15	19	61	4	67 ( 2 )
Pioneer Mtns.	30	8	23	59	10	279 ( 9 )
Tobacco Root Mtns.	31	10	28	56	5	174 ( 6 )
Bridger Mtns.	32	11	22	60	7	109 ( 4 )
Tendoy Mtns.	38	11	27	53	9	78 ( 3 )
Gravelly Mtns.	39	8	22	61	9	143 ( 5 )
Madison Mtns.	40	20	20	49	11	265 ( 9 )
Gardiner	41	17	25	50	8	288 ( 10 )
Absaroka Mtns.	42	12	27	54	7	112 ( 4 )
TOTAL PERCENTAGE		12	24	56	8	( 100 )

Table B-19. Hunters' reactions to antlerless elk management scenario, by area (in percent).

Area	Area No.	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Libby	1	38	28	23	11	260 ( 9 )
Bob Marshall	13	57	20	11	12	107 ( 4 )
Augusta	14	53	27	14	6	243 ( 8 )
Superior	19	53	27	15	4	236 ( 8 )
Flint Creek	20	63	20	12	5	329 ( 11 )
Butte	24	59	27	8	6	108 ( 4 )
Townsend	25	66	18	10	5	200 ( 7 )
Little Belt Mtns.	26	60	22	15	3	67 ( 2 )
Pioneer Mtns.	30	56	24	12	8	279 ( 9 )
Tobacco Root Mtns.	31	65	19	7	9	176 ( 6 )
Bridger Mtns.	32	57	19	15	9	109 ( 4 )
Tendoy Mtns.	38	69	19	5	6	78 ( 3 )
Gravelly Mtns.	39	50	24	18	8	143 ( 5 )
Madison Mtns.	40	62	18	12	8	264 ( 9 )
Gardiner	41	55	21	15	8	287 ( 10 )
Absaroka Mtns.	42	59	22	11	8	111 ( 4 )
TOTAL PERCENTAGE		57	22	13	7	( 100 )

APPENDIX C

ADDITIONAL ANALYSES:

RESPONSES FROM ALL-TERRAIN USERS, MEMBERS OF  
ORGANIZATIONS, AND YOUNGER HUNTERS





## APPENDIX C

### ADDITIONAL ANALYSES: RESPONSES FROM ALL-TERRAIN USERS, MEMBERS OF ORGANIZATIONS, AND YOUNGER HUNTERS

#### I. Responses of Hunters Who Used a Dirt Bike or All-terrain Vehicle on Their Most Recent Elk Hunting Trip

The use of an all-terrain vehicle (ATV) for hunting creates a unique set of management considerations, making it desirable to compare the responses of ATV users with those of hunters who did not use an ATV.

Only 137 of the hunters surveyed reported using a dirt bike or other off-road vehicle on their most recent hunting trip. This number may have been low if more ATV's were used earlier in the hunting season when roads were less snowy.

Residents and non-residents were equally likely to have used an ATV on their most recent trip (about 4.5 percent of each group).

There were no differences between ATV users and non-users in rate of harvest; just under 20 percent of each group had taken an elk on their last hunting trip.

ATV users and non-users both chose their hunting locations for similar reasons. However, ATV users rated solitude and getting away from other hunters as less important reasons for hunting where they did, and rated getting a trophy elk and hunting with their family as more important, compared to hunters who didn't use an ATV.

The two groups differed on perceptions of road access and preferences for road management. Of the ATV users, 12 percent said that good road access was not at all important in their choice of hunting areas, compared to 24 percent of the non-users. Seventeen percent of the ATV users said their hunting area contained too few roads open to vehicle access, compared to 9 percent of the non-users.

Far more ATV users (35 percent) compared to non-users (15 percent) said that vehicles should be able to be used off roads to retrieve game. Thirty-three percent of the ATV users said hunters should be able to use vehicles only on open roads to retrieve game, compared to 54 percent of the non-users.

Tables C-1 to C-6 show the two groups' views on the six management scenarios. More ATV users than non-users favored the option requiring hunters to pick the district where they would hunt (Table C-2). ATV users also objected more strongly to point regulations (Tables C-4 and C-5). The two groups rated the other scenarios about the same.

## II. Responses of Hunters Who Said They Were Members of a Hunting, Conservation, or Sport Organization

State agencies often wonder whether many of the comments they receive at public meetings on big game management regulations and other issues come primarily from members of organizations. The responses of members and non-members of such groups were analyzed to identify and compare their preferences and behaviors.

About 30 percent of the Montana residents surveyed said they belonged to one or more such groups, compared to 61 percent of the non-residents. Members were slightly less likely to say their hunting area contained too few roads for hunting (Table C-7) and slightly more likely to favor using vehicles only on open roads to retrieve game (Table C-8). However, the differences were not that great, and their rank order of preferences was the same.

Tables C-9 to C-14 compare the attitudes of members and non-members toward the six management scenarios. Generally, members of organizations tended to rate the restrictive regulations more favorably than did non-members. As was the case with road management preferences, the rank order of responses was similar for members and non-members. For example, Table C-12 shows that 51 percent of the members of an organization favored two-point regulations, compared to just 41 percent of the non-members. However, the rank order of the two groups' responses was the same; more non-members favored two-point regulations than said they could accept them, couldn't accept them, or would need additional information to take a stance.

The differences between members and non-members may seem smaller than expected. One possible reason was that this analysis grouped together all hunters who were members of any hunting, conservation, or sport organization -- a large and very diverse set. Analysis by specific organization would be possible because these data were collected on the survey; hunters who said they were members of an organization were asked to name the specific groups. This analysis would likely yield larger distinctions among members of different organizations, which were masked by lumping all members together.

## III. The Views of Younger Hunters

The young people who are hunting today may be hunting for a long time. It's therefore helpful to know how their views and behaviors differ from those of older, more experienced hunters. Of course, this does not mean they will continue to hold those views as they grow older -- perhaps, with time, they will more closely resemble the older hunters.

For this set of analyses, hunters were grouped not just into two categories (younger and older) but into seven, ranging from 16 or younger to 60 or older.

Table C-15 shows that hunters of all ages had similar perceptions of the adequacy of road access; hunters in each age category felt the number of roads was about right, while roughly twice as many said there were too many roads as said there were too few roads.

Older hunters tended to say they should be allowed to use vehicles on closed roads or off roads to retrieve game (Table C-16). Younger and older hunters said that good road access was a more important reason for choosing hunting location than did hunters in median age brackets (Table C-17), and a similar pattern was found on the importance of solitude (Table C-18).

It is not necessarily age alone that created these differences. For example, more of the younger hunters lived in Montana (Table C-19), and many differences between resident and non-resident hunters have already been documented.

Tables C-20 to C-25 show that younger and older hunters had similar views of many management actions. The percent falling into each category (favor, accept, not accept, need more information) changed with age, but the relative ranks were very similar.

Table C-1. Comparison of ATV users' and non-users' attitudes toward unlimited elk permits (with reduced chances of taking a bull) (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
ATV used	32	27	17	24	131 ( 4 )
ATV not used	33	24	21	22	2892 ( 96 )
TOTAL PERCENTAGE	33	24	20	22	( 100 )

Table C-2. Comparison of ATV users' and non-users' attitudes toward unlimited permits for one area (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
ATV used	28	36	31	5	132 ( 4 )
ATV not used	20	33	36	11	2897 ( 96 )
TOTAL PERCENTAGE	20	33	36	11	( 100 )

Table C-3. Comparison of ATV users' and non-users' attitudes toward limited permits for one area (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
ATV used	16	17	57	10	133 ( 4 )
ATV not used	13	20	57	10	2899 ( 96 )
TOTAL					
PERCENTAGE	13	20	57	10	( 100 )

Table C-4. Comparison of ATV users' and non-users' attitudes toward two-point regulations (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
ATV used	41	33	21	4	132 ( 4 )
ATV not used	45	31	17	7	2903 ( 96 )
TOTAL					
PERCENTAGE	45	31	17	7	( 100 )

Table C-5. Comparison of ATV users' and non-users' attitudes toward five-point regulations (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
ATV used	8	22	64	6	133 ( 4 )
ATV not used	12	24	56	8	2908 ( 96 )
TOTAL					
PERCENTAGE	12	24	56	8	( 100 )

Table C-6. Comparison of ATV users' and non-users' attitudes toward regulations concerning antlerless elk hunted by district (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
ATV used	57	26	11	6	133 ( 4 )
ATV not used	57	22	14	7	2910 ( 96 )
TOTAL					
PERCENTAGE	57	22	13	7	( 100 )

Table C-7. Comparison of organizational members' and non-members' evaluations of road access (in percent).

	Too Few	About Right	Too Many	Number of Respondents (Percentage of Total)
Organizational member	7	71	22	1183 ( 39 )
Organizational non-member	11	67	22	1812 ( 60 )
TOTAL PERCENTAGE	9	68	22	(100)

Table C-8. Comparison of organizational members' and nonmembers' evaluation of road management for game retrieval purposes (in percent).

Respondents	Open Only	Closed OK	Off-road OK	Number of (Percentage of Total)
Yes	58	27	15	1165 ( 39 )
No	50	33	17	1797 ( 61 )
TOTAL PERCENTAGE	53	30	16	(100)



Table C-9. Comparison of organizational members' and non-members' attitudes toward unlimited elk permits (but reduced chances of taking a bull) (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Yes	31	25	24	20	1183 ( 39 )
No	34	23	18	24	1814 ( 60 )
TOTAL PERCENTAGE	33	24	20	22	(100)

Table C-10. Comparison of organizational members' and non-members' attitudes toward unlimited elk permits (but reduced chances of taking a bull) for one area (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Yes	21	34	35	10	1186 ( 39 )
No	20	32	37	11	1818 ( 60 )
TOTAL PERCENTAGE	20	33	36	11	(100)

Table C-11. Comparison of organizational members' and non-members' attitudes toward limited elk permits (but reduced chances of taking a bull) for one area (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Yes	15	20	55	9	1186 ( 39 )
No	11	20	59	10	1822 ( 61 )
TOTAL PERCENTAGE	13	20	57	10	(100)

Table C-12. Comparison of organizational members' and non-members' attitudes toward two-point regulations (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Yes	51	30	13	6	1188 ( 39 )
No	41	32	20	7	1821 ( 60 )
TOTAL PERCENTAGE	45	31	17	7	(100)

Table C-13. Comparison of organizational members' and non-members' attitudes toward five-point regulations (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Yes	18	25	48	9	1191 ( 39 )
No	9	23	61	7	1824 ( 60 )
TOTAL PERCENTAGE	12	24	56	8	(100)

Table C-14. Comparison of organizational members' and non-members' attitudes toward antlerless elk regulations, by district (in percent).

	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
Yes	62	20	12	6	1188 ( 39 )
No	54	24	14	8	1828 ( 61 )
TOTAL PERCENTAGE	57	22	14	7	(100)

Table C-15. Hunters' perceptions of road access, by age (in percent).

Hunter's Age	Too Few	About Right	Too Many	Number of Respondents (Percentage of Total)	
10 - 16 years	10	68	21	164	( 5 )
17 - 21 years	9	64	27	149	( 5 )
22 - 29 years	7	68	25	466	( 15 )
30 - 39 years	9	67	24	844	( 28 )
40 - 49 years	10	69	21	689	( 23 )
50 - 59 years	12	70	19	424	( 14 )
60 years and older	10	72	18	269	( 9 )
TOTAL PERCENTAGE	10	68	22		(100)

Table C-16. Hunters' opinions on using vehicles on roads to retrieve game, by age (in percent).

Respondents (Percentage of Total)	Number of			
Hunter's Age	Open Only	Closed OK	Off-road OK	of Total)
10 - 16 years	52	32	16	163 ( 5 )
17 - 21 years	53	30	17	146 ( 5 )
22 - 29 years	63	25	11	461 ( 15 )
30 - 39 years	59	28	13	825 ( 28 )
40 - 49 years	50	31	18	689 ( 23 )
50 - 59 years	46	35	19	423 ( 14 )
60 years and older	38	37	25	265 ( 9 )
TOTAL PERCENTAGE	53	31	16	(100)

Table C-17. The importance of good road access in choosing hunting location, by age (in percent).

Age	Very Important	Important	Not Very Important	Not at all Important	Number of Respondents (Percentage of Total)
10 - 16 years	18	35	36	11	157 ( 5 )
17 - 21 years	14	27	37	22	147 ( 5 )
22 - 29 years	7	26	41	26	466 ( 16 )
30 - 39 years	8	31	35	25	843 ( 29 )
40 - 49 years	11	30	32	26	681 ( 23 )
50 - 59 years	14	34	31	21	410 ( 14 )
60 years and older	15	40	27	17	248 ( 8 )
TOTAL PERCENTAGE (100)	11	31	34	23	

Table C-18. The importance of solitude in choosing hunting location, by age (in percent).

Age	Very Important	Important	Not Very Important	Not at all Important	Number of Respondents (Percentage of Total)
10 - 16 years	23	42	26	8	145 ( 5 )
17 - 21 years	30	42	20	8	141 ( 5 )
22 - 29 years	39	43	14	4	459 ( 16 )
30 - 39 years	39	41	15	4	840 ( 29 )
40 - 49 years	38	41	15	6	693 ( 24 )
50 - 59 years	31	48	16	4	403 ( 14 )
60 years and older	27	41	20	11	234 ( 8 )
TOTAL PERCENTAGE (100)	36	43	16	5	

Table C-19. The importance of hunting for meat in choosing hunting location, by age (in percent).

Age	Very Important	Important	Not Very Important	Not at all Important	Number of Respondents (Percentage of Total)
10 - 16 years	51	38	10	2	164 ( 5 )
17 - 21 years	46	31	17	5	149 ( 5 )
22 - 29 years	42	36	17	5	473 ( 16 )
30 - 39 years	34	38	21	7	851 ( 28 )
40 - 49 years	26	37	25	12	701 ( 23 )
50 - 59 years	25	33	24	18	426 ( 14 )
60 years and older	24	34	22	19	263 ( 9 )
TOTAL PERCENTAGE (100)	32	36	21	10	

Table C-20. State of residence, by age (in percent).

Age	Montana	Other	Number of Respondents (Percentage of Total)
10 - 16 years	94	5	165 ( 5 )
17 - 21 years	91	9	150 ( 5 )
22 - 29 years	80	20	474 ( 15 )
30 - 39 years	69	31	856 ( 28 )
40 - 49 years	59	41	710 ( 23 )
50 - 59 years	59	41	438 ( 14 )
60 years and older	69	31	282 ( 9 )
TOTAL PERCENTAGE	69	31	( 100 )

Table C-21. Hunters' reactions to unlimited elk permits (and reduced chances of getting a bull), by age (in percent).

Age	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
10 - 16 years	23	28	20	29	159 ( 5 )
17 - 21 years	31	20	26	22	148 ( 5 )
22 - 29 years	34	22	21	22	469 ( 16 )
30 - 39 years	36	23	21	21	845 ( 28 )
40 - 49 years	33	23	24	21	697 ( 23 )
50 - 59 years	33	27	18	22	420 ( 14 )
60 years and older	32	28	11	29	269 ( 9 )
TOTAL PERCENTAGE (100)	33	24	20	22	

Table C-22. Hunters' reactions to unlimited permits but with mandatory choice of only one hunting district, by age (in percent).

Age	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
10 - 16 years	22	25	40	12	158 ( 5 )
17 - 21 years	17	35	40	7	149 ( 5 )
22 - 29 years	21	33	37	10	468 ( 15 )
30 - 39 years	20	31	39	10	848 ( 28 )
40 - 49 years	23	33	33	11	701 ( 23 )
50 - 59 years	16	36	35	12	424 ( 14 )
60 years and older	18	38	30	14	265 ( 9 )
TOTAL PERCENTAGE (100)	20	33	36	11	



Table C-23. Hunters' reactions to limited permits (and increased bull elk chances), by age (in percent).

Age	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
10 - 16 years	19	30	40	11	159 ( 5 )
17 - 21 years	15	17	59	9	149 ( 5 )
22 - 29 years	12	17	61	9	468 ( 15 )
30 - 39 years	13	18	62	8	849 ( 28 )
40 - 49 years	14	20	56	10	698 ( 23 )
50 - 59 years	9	21	58	11	427 ( 14 )
60 years and older	11	25	49	14	266 ( 9 )
TOTAL PERCENTAGE (100)	13	20	57	10	

Table C-24. Hunters' reactions to two-point regulations, by age (in percent).

Age	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
10 - 16 years	39	28	26	7	159 ( 5 )
17 - 21 years	40	35	20	5	149 ( 5 )
22 - 29 years	50	26	17	7	465 ( 15 )
30 - 39 years	49	30	14	7	848 ( 28 )
40 - 49 years	50	28	15	7	702 ( 23 )
50 - 59 years	38	36	20	7	429 ( 14 )
60 years and older	29	43	18	9	267 ( 9 )
TOTAL PERCENTAGE (100)	45	31	17	7	

Table C-25. Hunters' reactions to five-point regulations, by age (in percent).

Age	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
10 - 16 years	7	21	67	5	158 ( 5 )
17 - 21 years	6	23	66	5	149 ( 5 )
22 - 29 years	11	24	57	8	470 ( 15 )
30 - 39 years	14	25	53	8	850 ( 28 )
40 - 49 years	16	24	52	7	702 ( 23 )
50 - 59 years	13	21	58	8	430 ( 14 )
60 years and older	4	26	58	11	266 ( 9 )
TOTAL PERCENTAGE (100)	12	24	56	8	

Table C-26. Hunters' reactions to antlerless elk management scenario, by age (in percent).

Age	Favor	Do Not Favor But Would Accept	Not Acceptable	Need More Information to Respond	Number of Respondents (Percentage of Total)
10 - 16 years	51	23	17	9	159 ( 5 )
17 - 21 years	57	24	11	7	149 ( 5 )
22 - 29 years	60	21	12	7	466 ( 15 )
30 - 39 years	60	19	14	7	851 ( 28 )
40 - 49 years	60	19	12	8	703 ( 23 )
50 - 59 years	52	26	16	6	429 ( 14 )
60 years and older	43	36	14	8	270 ( 9 )
TOTAL PERCENTAGE (100)	57	22	13	7	



